COMPUTERWORLD

THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

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Vol. XVII, No. 33

COMPUTERWORLD'S ANNUAL HARDWARE ROUNDUP



Inside This Week

59 Minicomputers From 20 Vendors

Next Week: Micros

Inside

When ridership on its subways and buses dropped 22%, New York's Metropolitan Transit Authority took quick action — including a five-year, $8.5 billion capital improvement program managed completely by a project tracking system. **Page 53.**

• • •

When the First Bank of Minneapolis decided in 1978 to integrate both voice and data commercially on the same private branch exchange, it had no idea that it would become a pioneer in this area. **Page 65.**

• • •

A 32-bit, virtual memory superminicomputer claimed to be the first designed for the Unix environment has been introduced by Pyramid Technology Corp., a California-based start-up company. **Page 73.**

• • •

Narrowing the gap that separates one vendor's machines from another's, Interlan, Inc. has unveiled a networking system and terminal server that can be used to communicate host-to-host, terminal-to-host or personal computer-to-personal computer. **Page 79.**

• • •

The Export Administration Act is unfair and discriminates against U.S. manufacturers trying to compete in the worldwide market, the American Electronics Association boldly stated in a bulletin sent to 2,300 computer and electronics industry executives. **Page 81.**

ICA Warns Plan Poses Problems For Communications Managers

By Phil Hirsch
CW Washington Bureau

WASHINGTON, D.C. — Communications managers may have to make some hasty decisions about whether to retain or ditch the equipment they currently rent from AT&T if a plan now before the Federal Communications Commission goes into effect, the International Communications Association told the commission this month.

"The communications manager . . . is not faced with a . . . situation in which new products . . . can be evaluated one at a time," noted the users group, whose members include the nation's largest companies. "Furthermore . . . the time frame . . . places intense pressure on many corporate budget cycles."

The ICA's comments were made in a statement on a plan for selling users the terminals they are now renting, at tariffed prices, from AT&T and other telephone carriers. Under the FCC's Second Computer Inquiry Decision, terminals — officially known as customer premises equipment — have to be detariffed.

A list of installed customer premises equipment that users can buy next Jan. 1 can be found on Page 8.

The plan, developed by AT&T, has been tentatively approved by the FCC. If it receives the commission's final approval, it will go into effect next Jan. 1.

One reason for ICA's unhappiness with the plan is that it sets up a separate timetable for detariffing and selling installed terminals, which the FCC calls "embedded customer premises equipment." All of this equipment would be detariffed on Jan. 1. AT&T Information Systems, Inc., formerly American Bell, Inc., would offer some of the equipment for sale immediately, but sale of the rest could be deferred as much as two years, until Jan. 1, 1986.

The plan includes a "price predictability program" that caps the monthly charges on leased business customer premises equipment after Jan. 1, 1984. However, this program would expire 18 months later — six months before some detariffed business terminals, such as electromechanical private branch exchanges, may be offered for sale.

By comparison, the price predictability program for residential telephones would not expire until Jan. 1, 1986, 24 months after it began.

AT&T Information Systems has promised that its sales prices for

(Continued on Page 8)

DEC's Annual Earnings Dive 32%

By Bill Laberis
CW Staff

MAYNARD, Mass. — Intensifying competition and increased outlays for new products and for research and development combined to hand Digital Equipment Corp. its first decline in yearly profits in 13 years.

The year-end results left DEC watchers divided about the future direction of the No. 2 computer company. While most analysts believe the worst has passed, several expressed doubt that DEC will ever regain the market momentum that until this year brought rapid annual growth and widespread user acceptance.

DEC's earnings dove 32% for the year ending July 2 to $283.6 million or $5 per share, compared with profits of $417 million or $7.53 per share in 1982. Revenues for the year were up 10% to $4.27 billion, compared with $3.88 billion a year earlier.

DEC'S SLIDE IN PROFITS

Period Ending	Revenues (% Change)	Earnings (% Change)
Oct. 2, 1982	$927.5 Million (10%)	$57 Million (-36%)
Jan. 2, 1983	$1.02 Billion (5%)	$61 Million (-38%)
April 2, 1983	$1.09 Billion (9%)	$80 Million (-26%)
July 2, 1983	$1.23 Billion (14.7%)	$86 Million (-29%)
Fiscal Year 1983	$4.27 Billion (10%)	$283.6 Million (-32%)

CW Chart

A company spokesman blamed intense price competition across several of DEC's major product lines for the weak profit performance.

Results for the fourth quarter showed a sharp revenue gain of nearly 15%, reaching $1.27 billion. But profits in the quarter continued the downward trend that started a year ago (see chart), closing the quarter down 29% to $86 million or $1.51 per share.

Order rates showed continued improvement in the fourth quarter because of the increased availability of

(Continued on Page 6)

Economy Forces Shift in Policy

Polls Find Fewer DPers Being Relocated

By Katherine Hafner
CW Staff

Corporations are relocating fewer DP employees than ever before as they begin to rethink their overall relocation strategies, an informal telephone poll of DP executives by *Computerworld* has found.

CW's findings were consistent with those of a study recently issued by Merrill Lynch Relocation Management, Inc., which concluded that relocations in 1982 dropped 11% from the year before.

While the 1960s and 1970s saw frequent geographical shifts among employees, the economic hard times and high interest rates of the 1980s have forced employers to reexamine their relocation policies, according to the Merrill Lynch study.

The chief reason for curbing the relocation of DP personnel — the high cost involved — is the same as for corporate employees in other divisions. However, there are some ways in which data processing's idiosyncrasies affect employees differently from others.

For example, DP people, who traditionally have transferred from company to company with great frequency, may be viewed askance by an employer considering investing about $50,000 in a relocation. "Sadly, we [management information systems] types have a reputation for being gypsies," commented James Kerwin, corporate director of MIS for Bell and Howell Co. in Chicago. "We aren't known for staying with an employer for 10 years, and that can make it very tough if the employer doesn't think the person they relocate will stay around."

This, coupled with the fact that DP specialists are no longer difficult to find and can more easily be hired locally, has caused DP executives to put a stop to frequent relocation and

(Continued on Page 4)

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Centers on XL40 System

User to Push Suit Against Pertec

By Patricia Keefe
CW Staff

ELMHURST, Ill. — Although charges of negligence were dismissed against Pertec Computer Corp. in May, a computer service bureau here has decided to press forward with a $1.8 million lawsuit charging the firm with fraud, deceit and breach of contract.

The suit was filed two years ago in U.S. District Court in Chicago by Vanco Business Management, Inc. It is slated to go to trial this fall.

The suit's charges of negligence were dismissed on a pretrial motion because Illinois law prohibits recovery of economic damages due to negligence.

Vanco's suit alleges that in 1978, it was induced to purchase and lease portions of Pertec's XL40 turnkey system because of a series of "false and fraudulent statements" made by representatives of Pertec. Those statements led the plaintiff to believe that the XL40 system "would accommodate all of its processing requirements," Vanco said. The total value of the contract was $96,768.80.

As a result of its purchase and lease of the XL40, Vanco claims, it suffered the loss of at least two clients, the destruction of client files and data, repeated system failures and "loss of profits and income and damage to its business reputation."

Pertec said in its response to Vanco's suit that it "categorically denies" all charges and knowledge of the nature or requirements of Vanco's computer service bureau, according to its attorney, Richard Rappaport. The vendor maintained that Vanco has not "suffered any compensatable damages" as a result of its use of the XL40 system.

Pertec has countersued for a yet undetermined figure which it said Vanco has failed to pay under its purchase and lease agreements.

In the suit, Vanco claims that while Pertec designed the XL40 as a data entry system to be used with other mainframe systems, the vendor sold it as a stand-alone computer — even though, according to the suit, the firm had very little experience with the application of the XL40 in stand-alone applications.

'Serious Design Deficiencies'

The suit also says it was not until summer 1981 that Vanco learned from employees of Sperry Corp., successors to Pertec's service and maintenance obligation, "that the XL40 system should never have been sold as a stand-alone system and had serious design deficiencies in such an application for [Vanco's] business needs."

The service bureau further maintains Pertec representatives assured it that the imminent introduction of a new software system under development — called Axel — would cure the repeated system errors and breakdowns. However, Axel was never made available to Vanco, according to its attorney, Arthur Solomon. He added that this assurance helped to delay Vanco's legal action.

When contacted last week, Pertec attorney Rappaport was unable to state whether Axel was ever developed or released.

Vanco operates under the name of Management-Data Services, Inc. It provides data processing services to approximately 40 clients, primarily physicians and collection agencies. Billing services are performed for its medical clients.

Also provided is an accounting system for remittances to several thousand clients of the collection agencies and cash reports.

The firm has since returned leased portions of the XL40 system to Pertec and now uses other components that it had purchased from Pertec for data entry to an IBM System/38, which it bought in October 1982.

Corrections

In Charles P. Lecht's article "For Whom the Bell Tolls . . . For Free" [CW, Aug. 8], the "variable bit Hamming code" mentioned should have read "variable bit Huffman code."

In "Stand-Alone System Includes Array Processor Architecture" [CW, Aug. 1], the vendor's name should have been Analogic Corp. In addition, the key feature of the machine is its integration of the array-oriented language, APL, with the processing power of the array processor. The system also incorporates APL functions in microcode, which Analogic said results in high APL performance on large problems.

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CAB Changes Stance on Airline Systems Issue

By Robert Batt
CW West Coast Bureau

WASHINGTON, D.C. — A recent move by the Civil Aeronautics Board (CAB) could cause a major upheaval in the airline industry's computer reservations systems.

The CAB last week invited airlines to comment on the existing reservations systems and propose ways to amend alleged abuses. The CAB's call for comments, widely believed to be an acknowledgement that all is not well with the current situation, followed concerted pressure from Congress, the U.S. Department of Justice and smaller airlines.

The move, industry officials said, could lead to changes in the way tens of thousands of domestic travel agents book reservations with airlines, hotels and car rental agencies. If it does, the losers would be American Airlines and United Airlines, which currently dominate the airline reservations industry.

Thirty-Day Deadline

The CAB gave airlines 30 days in which to present their cases in writing. This will be followed by up to 15 days of oral testimony and a 30- to 60-day period for CAB staff to propose new rules.

"We expect to have specific rules governing the use of computer reservations systems by January or February next year," CAB Chairman Dan McKinnon said in a recent telephone interview.

According to the CAB, American's Sabre network and United's Apollo network together account for 80% of U.S. travel agents' use of computer reservations systems. The remaining 20% of the business goes to Eastern Airlines, Trans World Airlines and Delta Air Lines. An estimated $20 billion in domestic air transportation was bought through computerized systems in 1982.

Many air carriers, especially the smaller ones unable to start their own systems, have charged that Sabre and Apollo incorporate anticompetitive biases into their programs. The air carriers maintain that:

- The systems bias the information they provide so that travel agents will book passengers on American and United flights, even when cheaper or more convenient carriers are available.
- The two giants discriminate in the fees they charge for competitors to use their systems and pressure travel agents to book reservations on their flights.
- United and American have proprietary rights to information about changes in schedules and ticket sales of other airlines, which gives them an unfair competitive advantage.

Any major change in the current system would be a severe blow to American and United, which between them have spent over $400 million in developing their systems.

Decision Sparks Both Anger, Anticipation

The decision by the Civil Aeronautics Board (CAB) to look into alleged abuses by the nation's two top computerized reservations systems brought swift responses from airline and travel executives.

"We do not accept the allegations that our systems are operated in an anticompetitive way," said Lowell Duncan, vice-president of corporate communications at American Airlines. "We are open to adjustments, but if rules are imposed that make our system untenable, we may choose not to remain in the computerized reservations business."

Duncan said American had invested $160 million in its Sabre system and took a gamble by pioneering a new area. He complained that other airlines that refused to take the gamble are now imploring the government to make the system available to them at no cost.

United Airlines offered no comment on the latest developments, except to say it would make its recommendations to the CAB.

The CAB decision was greeted as a major victory by many of the smaller airlines, with some of them making clear their determination to see United and American divested of their systems and an independent third-party system set up.

"This is a fundamental structural problem within the industry which cannot be fully solved without divestiture. We hope these systems can be operated by agencies outside of the airlines," said Marvin Cohen, ex-chairman of the CAB and now an attorney representing Pacific Express, Inc., a San Francisco-based airline.

Clark Onstad, vice-president of government affairs at Continental Airlines, expects the CAB's move to "eliminate hundreds of millions of dollars in incremental revenue that currently flows into the coffers of United and American because of the bias in their systems, and I expect it to have an impact on market share."

However, as the battle over the future of computerized reservations heats up, United and American may find themselves with valuable allies in the form of the nation's travel agents. Commenting on the latest moves, Larry Clark, national director of the American Society of Travel Agents said, "We are concerned about the CAB decision. We do not feel the legislative arena is the proper place to resolve these complex issues. If the system is restructured so as to perform in a less comprehensive way, it will be the consumer who will suffer."

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Fewer DPers Being Moved

(Continued from Page 1)

to relocate a person only if the move can be justified.

In the *Computerworld* survey, six of the 10 DP executives interviewed said that relocation at their companies is not only down from last year at this time, but that there is considerably less movement than five or 10 years ago. Two others said relocation is stable from last year but down from five or 10 years ago. The two remaining managers said that relocation is up from last year, but only because a new data center was established and relocation was unavoidable.

"We have a couple of hundred MIS people around the country and we haven't done any relocations in a year and a half," Bell and Howell's Kerwin commented. "I don't think that will turn around at all. The economy is keeping folks a bit closer to home. This last recession hit MIS people, too."

Additional cost considerations cited by the DP executives include the increasing number of working spouses, which makes employees less willing to uproot themselves, and the unremitting high cost of housing in certain areas. Because most large companies assist a relocated employee with a mortgage and cost-of-living differential, moving an employee to a high cost-of-living area is often a major investment.

"It gets very expensive," a spokesman for Occidental Petroleum Corp. in Houston said. "Relocating people to Los Angeles is the worst. It can cost $45,000 to $75,000 for the move."

In addition to the obvious solution of relocating employees less, high personnel costs have, in turn, made some DP executives think seriously about centralizing their DP facilities. "We're rethinking our strategy completely," reported James Yoakum, vice-president of information systems at Marriott Corp. in Washington, D.C. "With personnel costs a major consideration, we're considering a more centralized approach [to DP facilities]."

The cost of shifting people from place to place while maintaining a decentralized operation was of concern to Kenneth Hawes, director of information systems at SCM Corp. in Stamford, Conn. Hawes said his company recently reconsolidated its DP facility to Durham, N.C., a move that accounted for the relocation of 36 people in 1982.

"That high number of relocations is an anomaly," Hawes said. "Otherwise, our turnover has been at less than 5% in the past two years."

By staffing one central facility, Hawes pointed out, he has achieved a large reduction in staff. "We've looked at it as a very cost-effective situation," he said.

"I laugh at some of the articles about decentralization," Hawes added. "It's my opinion that we'll actually end up with a lot of intelligent terminals tied to a central mainframe. It's much more cost-effective that way."

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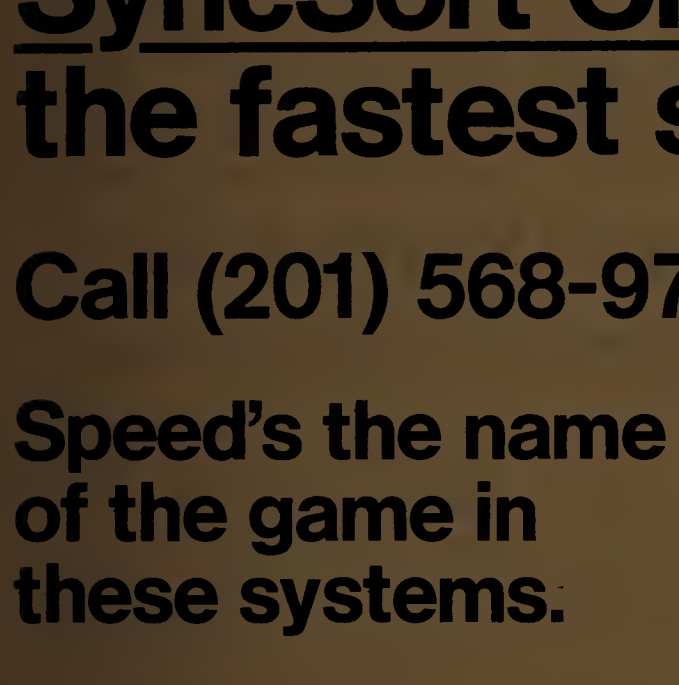
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DEC Not Expected to Regain Market Momentum

By Bill Laberis
CW Staff

The consensus of analysts interviewed last week on DEC's fiscal 1983 performance was that the market has changed in recent years to the point where DEC will not regain the market momentum it once enjoyed.

The primary reasons: increased price competition, fostered in great part by IBM; the inability of DEC's management to react quickly and decisively to market changes; and the growing threats to DEC's strength, both on the high end from its traditional minicomputer competitors, and the low end from increasingly powerful microcomputers.

"The rules of the game have changed, and DEC will never see the same results it showed in the past," according to Marc G. Schulman, the vice-president who tracks DEC for the First Boston Corp. "Revenues this year were below what management thought they'd be, and they've got problems on the cost side. Expenses are growing too fast this early in the recovery cycle."

Commenting on some of DEC's new product offerings, Schulman said shipments of the company's low-end personal computer line "are about on course," but said the Professional, its top-of-the-line personal computer, "has some problems." Unlike the IBM Personal Computer, the Professional runs on a proprietary DEC operating system, "which is not up to snuff," Schulman maintained.

Schulman joined Frederic Cohen, DEC analyst with L.F. Rothschild, Unterberg, Towbin, in downgrading estimates for DEC's earnings next year. Both also attributed potential long-term problems to the increasing share of DEC's revenues derived from low-end products, which typically carry lower profit margins than high-end offerings.

Cohen recently removed DEC from his company's list of recommended stocks, citing what he termed disappointing progress in DEC's personal computer business. Cohen said further that Data General Corp.'s new MV10000 has upstaged DEC's high-end VAX-11 series of superminicomputers, DEC's bread-and-butter line.

Sonny Monosson, a third-party seller of DEC equipment and publisher of the "Monosson on DEC" newsletter, criticized both DEC's product strategy and management structure.

According to Monosson, DEC's much-touted management reorganization this year, which sought to decentralize the decision-making process, "is just a smoke screen, a big camouflage move for the matrix-type management structure still in place."

Monosson said DEC still has too many people involved in making key product and marketing decisions. "So they'll continue to get burned in new product areas because they just can't react fast enough, like IBM can," Monosson said. "Unless they change their style, you'll see repeats of what happened with their personal computer, where they just buried their heads in the sand," he predicted.

DEC, Monosson said, lost the confidence and trust of many large users when it scrapped its Jupiter high-end project in May [CW, May 30]. The company "shocked" users because "of DEC's repeated assurances that the new processor would materialize."

Carol E. Muratore, a DEC analyst with Prudential-Bache Securities, Inc., was more optimistic about DEC's immediate future than other analysts interviewed last week, saying that healthier profit margins will return when the company's underutilized plants operate closer to capacity as the economy improves.

Muratore added that DEC's stepped-up research and development spending of the past six months will help the company get its new products out the door "in a more timely fashion than we've seen in the past."

DEC's new management organization, she said, will prove "well suited to the company's product strengths."

DEC Earnings Take 32% Dive

(Continued from Page 1)

the company's new products, according to Alfred Bertocchi, vice-president of finance and administration. Bertocchi added that demand for DEC's office automation products has been particularly strong, and "the company is anticipating improved operating results in fiscal 1984 due to its strong product position ... and a recently realigned marketing organization more closely focused on the company's key markets."

But asked if DEC would again realize the growth rates of past years, another company spokesman said, "There is no question we have had to lower our goals. It will take several years to get back to the profits and revenue growth of before. It's something we aspire to, which is not saying we can."

Calif. System Sniffs Out Unemployment Schemes

By Katherine Hafner
CW Staff

WASHINGTON, D.C. — As recently as eight years ago, law enforcement officials relied on anonymous telephone calls and tips for sniffing out unemployment insurance fraud schemes.

That all began to change in 1976 when Robert Keel, a retired Los Angeles detective, joined California's Employment Development Department. Keel introduced a computerized system for detecting con artists who start up phony businesses and hire fictitious employees, then lay them off and wear disguises to pick up the unemployment checks.

"When I came into the department, one of the first cases I ran into was a false company," Keel said. "I was a little dismayed that we didn't have some sort of reliable detection system that was good enough to address the issue in a state this size. At that time, California was paying out about $2 billion a year in benefits, and we had a hand tally system to keep track of fictitious employer schemes."

Though such schemes were far from epidemic, with four or five big cases cropping up each year, Keel set out to replace the manual system. Working with others in the department, he gathered all pertinent information regarding past cases. With federal funding, he hired a consultant knowledgeable in both white-collar crime and computer programming to develop the software.

By 1978, the system was operational. "We ended up with an ongoing tracking file of all newly registered employers in the state," Keel said. "The very first day the system was going, we detected a fictitious employer."

The department's analyst and special investigator work on Four Phase Systems, Inc. terminals emulating IBM 3270s linked to the state Health and Welfare Agency data center's IBM 370 mainframe.

"They're looking for certain criteria," explained Gary Richardson, a programmer analyst at the department. "When the criteria are met, the employer is keyed in on, matches are based on previous cases and once they find a pattern, they decide whether to investigate or not."

Keel has found that the automated system not only acts as a deterrent, but fictitious employer schemes are now uncovered much earlier in the game. "Under the old system, they were into us for $100,000 before we even knew they existed, and they'd already flown the coop to steal from another state," Keel said. "Now we usually catch them before they've stolen any money, and the minute they steal anything we're all over them like ants on honey."

Nearly 30 states have since set up or plan to set up similar computerized profiles of phony employers. The U.S. Department of Labor is also giving each state $6,000 to copy California's method, at a much lower cost than starting from scratch. "We think that taking [California's] software and adapting it to any state's computer system is a wise investment," noted Carolyn Golding, director of the U.S. Labor Department's Unemployment Insurance Service.

"The computerized profiles give us a very active tool we can use that's far better than hot tips and telephone calls," Golding said. "It also has something else — technology is working in our favor rather than against us. This is the prevention and early detection side of what you read about when you read about computer fraud."

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IBM Asks Order Forcing Hitachi to Drop Suit

By Jeffry Beeler
CW West Coast Bureau

SAN FRANCISCO — IBM last week urged a federal court to order Hitachi Ltd. to drop a lawsuit that might allow the Japanese company to retain trade secrets it has already admitted to stealing from the industry giant.

In the same Aug. 8 motion, IBM also asked the court to begin as soon as possible the trial phase of the firm's 11-month-old civil suit against Hitachi.

IBM's motion before U.S. District Court Judge Spencer Williams seeks to bar Hitachi from proceeding with a lawsuit the Tokyo-based company filed last month in Japan against its American competitor. The effect of the Japanese litigation would be to nullify a 1982 federal court order requiring Hitachi to return all the proprietary systems technology it had stolen from the U.S. firm, IBM's attorneys said in their filing.

The injunction covers a wide assortment of purloined IBM trade secrets and documents, including 11 volumes of the "Adirondack" workbooks, which contain detailed designs of the company's latest generation of hardware.

Last Nov. 10, Hitachi agreed to abide by the terms of the federal court order. But nearly eight months later, in Japan, the vendor filed a lawsuit that rejects calls for the same IBM technology to be surrendered to its owner. The American company "has no right to enjoin Hitachi" from using information in the disputed IBM documents "to design, develop, manufacture or market any computers or computer-related equipment," the Japanese affidavit said.

IBM blasted the Hitachi suit as a "direct move to oust [the federal court] of a portion of its jurisdiction and to eviscerate [its Nov. 10] injunction."

Elsewhere in last week's motion, IBM urged Williams to advance the trial for the firm's civil suit "to as early a date as possible." By undertaking "disruptive and duplicative" legal action in Japan, "the defendants have ably demonstrated their ability to bring this [civil] action to trial earlier" than they had originally indicated, the IBM motion said.

Initiated last Sept. 16, IBM's civil litigation seeks to deny Hitachi the use and benefit of all the trade secrets it reputedly swiped from the industry giant during late 1981 and the first half of 1982. The suit — and its accompanying criminal complaint — were the legal by-products of a highly publicized trade-secrets theft case that burst on the scene last summer following a successful Federal Bureau of Investigation sting operation.

Slapped with conspiracy indictments as a result of the eight-month undercover investigation were Hitachi, Mitsubishi Electric Corp. and more than 20 of their employees or alleged agents. Last February, Hitachi pleaded guilty to the criminal charges against it and received a $10,000 fine, the maximum penalty under U.S. law.

The outcome of the criminal side of the trade-secrets theft case is expected to have no impact on the resolution of IBM's civil suit.

R&D Firm To Start Up

MINNEAPOLIS — Honeywell, Inc. and Swedish-owned Ericsson Information Systems have announced plans to establish a research company to develop voice and data communications products for the U.S. market.

Slated to begin operations in October, Honeywell/Ericsson Development Co. will be based in Dallas. The company will be staffed by 150 technicians to be transferred from Honeywell and Ericsson operations.

The two companies also announced their intention to sign technology exchange and licensing agreements whereby Honeywell will acquire an interest in Ericsson Information System's advanced private branch exchange and packet-switching technologies.

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ICA Warns of Problems With Detariffing Plan

(Continued from Page 1)

business customer premises equipment will not, "in the aggregate, exceed net book value plus transaction costs" — that is, the current market value of the equipment plus the administrative, warranty and marketing expenses associated with preparing it for sale. But ICA objects to use of aggregation, contending that the sale price of each type of terminal should reflect the average depreciation of that equipment.

Using an aggregated net book value could allow AT&T to charge an inflated price for the terminals that sold well, ICA said. Buyers would then pay a hidden subsidy covering depreciation expense, which rightfully should be borne by the less popular terminals.

Ill-Defined Transaction Costs

Another problem with the FCC's tentative plan, the ICA said, is that it fails to define precisely "transaction costs."

The association said that even if the commission requires AT&T Information Systems "to establish [customer premises equipment] sales prices that approximate [true] net book value, the level of the accompanying transaction fee, if set too high, could discourage actual customer purchases ... [AT&T Information Systems] clearly has the incentive to overestimate these charges, particularly with respect to embedded business [customer premises equipment] product lines that it has not voluntarily placed on the market."

AT&T Information Systems supplied some evidence to support this concern in an Aug. 2 comment on the proposed customer premises equipment detariffing plan. For business communications users, the big news in that statement was that, in addition to the products announced earlier, some 1A key systems would also be offered for sale before Jan. 1, 1986. But the company added that "a sale program for 1A Key will necessarily involve high volumes of customer contacts.

"The complex and diverse nature of the equipment means that a large presale effort, frequently including inspections by [AT&T Information Systems] technicians, will be required to identify a system's capabilities and arrive at a firm price quote. Follow-up visits will be required to identify and label customer-purchased equipment."

In addition, AT&T Information Systems "will require time to develop systems to support purchased 1A Key equipment, including parts pricing and distribution, documentation and customer records."

Pros and Cons

Allowing as much as two years to elapse between the detariffing of embedded customer premises equipment and the start of a sales program would be good for AT&T Information Systems but bad for its customers, according to ICA.

It said the company would earn rental income during this period that it would otherwise have to forego, while users would have to continue leasing their installed terminals or purchase new equipment from another supplier.

Either of these options probably would be more expensive than buying the installed equipment, ICA said. Moreover, it added, if AT&T Information Systems offered its rental customers credits toward the purchase of new PBXs, telephones, modems, and/or data terminals made by Western Electric, the company could gain an unfair competitive advantage.

To get around these problems, the ICA suggested that the FCC "impose an interim price freeze before implementation of the detariffing plan." This would "allow [AT&T Information Systems] to formulate a ... plan to ... sell substantially all multiline [customer premises equipment] during 1984. The key to a successful detariffing plan is to allow all users, residential and business alike, to purchase their embedded [equipment] from the very beginning of the implementation of the plan."

The user group maintained that the FCC "must be careful to set up the appropriate safeguards to prevent the transaction costs ... from being anything more than minimal, [and] business users need, at a minimum, the same amount of time as residential users to prepare for the full deregulation of all embedded [customer premises equipment]."

What You Can Buy on Jan. 1

AT&T initially promised that users of the following customer premise equipment would be able to buy their installed equipment beginning next Jan. 1:

- ***Telephone sets:*** The Models 500 and 2500; multibutton electronic telephone sets.
- ***Voice terminals:*** Com Key, Touch-A-Matic 32 Automatic Dialer, Speakerphone, Comm-Stor, Voice Paging.
- ***Data communications equipment:*** Series 100, 200 and 300 modems; Dataphone II.
- ***Data terminal equipment:*** Dataspeed 40, printers, Model 43 teleprinter, Dataspeed 4540, Model 1000 teleprinter.
- ***Teleconferencing equipment.***

Some other items have since been added to the list. Notable among them are the Dimension and Horizon communications systems, including all associated feature packages, and Type 556 and 557 cord boards.

"Other embedded electromechanical equipment will be offered for sale by Jan. 1, 1986 or earlier, as conditions for viable sales plans are achieved," the Federal Communications Commission was told earlier this month by AT&T Information Systems, Inc., AT&T's deregulated terminal marketing subsidiary formerly known as American Bell, Inc.

Beginning in the fourth quarter of 1984, AT&T Information Systems also will offer users of 1A Key sets the option of buying them, provided the equipment is located behind private branch exchange or ESSX/Centrex switching systems. "This category accounts for approximately 50% of the 1A Key equipment in place," the company said.

The remaining "Key-as-main" equipment "will be offered for sale as experience is gained with the 'Key-behind' systems and as [AT&T Information Systems] gains the ability to handle in-place sales operations." In any event, Key-as-main equipment will become ready for sale no later than Jan. 1, 1986.

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Kin of Man Killed by Robot Awarded $10 Million

By Paul Gillin
CW Staff

DETROIT — A Wayne County Circuit Court jury last week awarded $10 million to the family of a Ford Motor Co. worker who was killed by a robot.

The decision against Unit Handling Systems, a division of Litton Industries, Inc., was the result of the Jan. 25, 1979, death of Robert Williams, a core stacking operator at Ford's Flat Rock, Mich., casting plant. Williams was struck in the head by a one-ton transfer robot while retrieving a part from the Deep Lane Storage System made by Litton.

The plaintiffs claimed that the system lacked a logical procedure for locking the robots out of the area in which the man was working, that the robot was not equipped with appropriate warning signals and that the Litton operations manual failed to include adequate safety instructions for human intervention in the automated process.

Paul Rosen, an attorney for the plaintiffs, also charged that the warning system on the Litton robot did not meet American Standards Association codes.

A Litton spokesman denied the charges. "In all of these installations, there is appropriate signage and instruction to operators, and the first rule is to shut down the system. The man ignored the safety instruction," spokesman Robert Knapp said.

Knapp said Litton has not decided whether it will appeal the verdict.

Concern Builds as Strike Continues Against Bell

By Tom Henkel
CW Staff

Mounting concern about the future was the prevalent feeling last week of both AT&T supervisors and telecommunications users as AT&T headed toward the second week of a walkout by the 650,000-member Communications Workers of America Union.

Foremen and supervisory personnel have been able to keep the highly automated Bell system running in spite of the walkout. However, the strike is delaying user installation and expansion plans, and some users are worried the skeleton force of managers now running the AT&T telephone network may get bogged down if the strike continues.

With 97% of the AT&T system computer-controlled and "in excellent repair," it has not been difficult to keep the system working, an AT&T spokesman said. If problems do develop, supervisors have been trained to make the necessary repairs.

Many AT&T supervisors worked their way up through the ranks, pointed out Don Mathis, a spokesman for Southern Bell (one of AT&T's operating companies), so the firm is not short on expertise. But there is a shortage of the manpower necessary to carry out the normal duties of the striking workers.

Conrad Pologe, a division manager for AT&T in New York, said the truncated AT&T work force will probably not be able to handle new installations until the strike is over. For data processing customers, that means requests for new lines will probably be put on hold for the duration of the strike.

Preferential Treatment

Pologe added that data communications customers are not going to get preferential treatment over regular telephone customers.

At this point, the AT&T operating companies responsible for line maintenance and installations are giving top priority to emergency organizations, such as hospitals, police and fire stations. Next in line is the maintenance of existing lines. New installations are at the bottom of the priority list.

While Pologe did not say it was impossible to have new lines installed — at least in the New York area — it is highly unlikely that many new installations will be completed until the strike is over.

"Repair is going to be a problem," admitted Pologe, who said so far there have been no major line problems to disrupt service. A spokesman for AT&T Communications (formerly the Long Lines Division) said the 6,747 managers in that division are trying to fill about 21,200 jobs. With each manager trying to juggle about four jobs, a string of major problems could severely impact long-distance communications, he said.

One user said last week that "at this point," the AT&T managers' "performance has been excellent." James A. Weiss, manager of data communications at Miami-based Eastern Airlines, noted the airline's existing network has been working well, but added that his main concern is whether the strike will restrict expansion plans at Eastern.

Eastern has been installing about 150 new circuits a month. Even when the strike is over, there may be a delay in getting back on schedule.

The strike is also putting service bureaus in a difficult position. Although several major service bureaus contacted last week reported only minor problems, they pointed out that they cannot bring new customers on-line.

At press time last week, little progress had been made in resolving the strike.



CW Photo by P. Gillin

Electrical workers struck against AT&T in sympathy with the Communications Workers of America. They are shown here picketing outside phone company offices in Framingham, Mass.



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U.S. to Ask Prison Term For Man Guilty of Sending Components to Soviet Bloc

By Peter Bartolik
CW Staff

ALEXANDRIA, Va. — The U.S. government will ask a federal court judge next month to impose a prison sentence on a businessman for illegally shipping embargoed electronic components to Soviet bloc countries.

Geunther Nachtrab, 43, of nearby Falls Church, Va., is now free on bail after being found guilty last month of nine counts of violating the Export Administration Act and regulations and one count of conspiring to violate the act.

Nachtrab faces a maximum sentence of 50 years in prison and a fine of $460,000 for shipping components valued at $40,000.

Contacted last week, Assistant U.S. Attorney Thomas Buchanan did not specify what sentence he would ask for. Sentencing is scheduled for Sept. 2.

Two Austrians and one West German still face prosecution in the same case. Buchanan said he will seek extradition to the U.S. or ask that they be prosecuted by their native authorities. However, the most he expects is that Klaus Taller, the West German, may be prosecuted by West German authorities.

Nachtrab and the others were indicted in April after former employees of Nachtrab informed U.S. Department of Commerce officials that embargoed goods had been shipped to East European countries.

Multiple Overseas Shipments

During a five-day trial that concluded with five hours of jury deliberations, the goverment presented proof that during the period of January to February 1982, Nachtrab made three overseas shipments of National Semiconductor Corp. integrated circuits; two shipments of Hewlett-Packard Co. diodes; one shipment of Motorola, Inc. transistors; and three shipments of integrated circuits manufactured by Advanced Micro Devices, Inc.

According to Buchanan, the Commerce Department had determined that all the components had dual military and civilian uses.

Nachtrab operated a company that he represented to vendors variously as TEE, Text Editing Equipment and The Electrical Exchange, Buchanan said, adding that he believes the firm was never formally incorporated. It was charged he bought components from vendors saying he was to use them at a nonexistent West Virginia manufacturing facility and in a contract with the Central Intelligence Agency.

Smuggled Through Austrian Firm

The goods, according to the government, were smuggled to Hungary through the Austrian firm of Steuerungstechnik and Messgeraete, which was owned and operated by the two Austrians, Anna Landau and her daughter, Jeanette Wellems. Some of the items were first shipped to Taller's West German firm, Contacta,

Another Strong Year

WASHINGTON, D.C. — Nearing the completion of its second year, the U.S. Customs Operation Exodus program has about doubled the statistics it compiled during its first year and is rapidly approaching a total interception of $100 million of illegal or unlicensed exports.

The program was formed almost two years ago to intercept goods being shipped overseas to Eastern bloc countries in violation of the Export Control Act.

Between Oct. 1, 1981, and June 30, 1983, the project made 1,785 seizures of improperly licensed or otherwise illegal export materials valued at $99,203,845 being shipped overseas, according to customs spokeswoman Chris Fraze. Customs agents accounted for 1,417 of those seizures valued at $99,046,078, with the balance credited to the U.S. Department of Commerce, Fraze said, adding that the statistics include violation of the Arms Export Control Act.

At the end of its first year, Operation Exodus was credited with a total of 765 seizures [CW, Nov. 22].

Out of those seizures, 217 cases were accepted for prosecution by the U.S. Department of Justice during the last 21 months, according to Fraze, resulting in 192 indictments and 222 arrests; 155 convictions have been handed down in federal courts.

DATA GENERAL INTRODUCES THE DESKTOP GENERATION.



One of Several Post-Settlement Rulings

AT&T Not to Pay Handling Expenses: Greene

By Phil Hirsch
CW Washington Bureau

WASHINGTON, D.C. — U.S. Federal District Court Judge Harold Greene decided earlier this month that "station-handling expenses" should not be transferred from the Bell operating companies to AT&T. Greene made that decision despite objections from several modem manufacturers that it would have "a decided negative impact on local telephone rates and competition."

Station-handling expenses include the costs of installing and testing telephones, data terminals and other customer premises equipment, such as terminals. An estimated $5 billion is involved.

The modem makers — through their trade association, the Independent Data Communications Manufacturers Association (IDCMA) — had contended that station expenses can be determined precisely through "sampling of Bell operating companies' records, selected cost studies or other methods." However, Greene said in his recent order that AT&T has persuaded him "there is no practical way to separate out the various handling costs."

The judge's comment was part of an order disposing of a number of requests for further changes in AT&T's plan of reorganization, which is a result of the U.S. vs. AT&T antitrust case settlement. At the same time, Greene gave final approval to the reorganization plan accepted earlier this month by AT&T [CW, Aug. 8].

In the course of ruling on the proposals for additional changes, Greene:

- Refused to change his mind about the assignment of inside wiring. It will remain with the Bell operating companies because "to assign such wiring to AT&T would be to insert AT&T-controlled facilities between the operating companies and the subscribers, and such an assignment would be entirely inconsistent with the basic purposes of the [antitrust case settlement]."
- Ruled that AT&T will not have to license its computer software to the Bell operating companies on a royalty-free basis. Reason: The operating companies did not help finance development of this software. (But the operating companies have been granted free licenses and sublicensing rights to all AT&T patents and related technical information developed with their financial assistance by Bell Laboratories, Inc. and Western Electric.)
- Told the Bell operating companies they can market customer premises equipment and directory advertising outside their service areas.

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AT&T Offshoots Announce Name

WASHINGTON, D.C. — The last of the seven regional phone companies created by the AT&T antitrust case settlement announced its official name last week. The Pacific Telesis Group (Pactel) will encompass the Pacific and Nevada Bell Telephone companies.

The other six regionals and the operating companies they own are:

- U.S. West: the Northwestern, Mountain and Pacific Northwest Bell Telephone Companies.
- Southwestern Bell Corp.: Southwestern Bell Telephone Co.
- Bell South: Southern, Southeastern Bell Telephone Companies.
- Bell Atlantic: Pennsylvania, Diamond State, Chesapeake and Potomac and New Jersey Bell Telephone Companies.
- New York New England Telephone Co. (Nynex): New York, New England Telephone Companies.
- American Information Technology (Ameritech): Illinois, Indiana, Michigan, Ohio and Wisconsin Bell Telephone Companies.

SIM to Sponsor Info Conference

HOUSTON — The Society for Information Management (SIM) will sponsor the Fourth International Conference on Information Management here on Dec. 15-17 at the Houstonian Hotel & Club.

Held in cooperation with the Association for Computing Machinery, the conference will feature 26 papers presented in the technical sessions by authors from both academe and the industry. The papers will address topics such as natural language query, software development, end-user computing, management of the information systems organization and federal systems and policies.

Featured speaker at this year's conference dinner will be Gerald R. Wagner, president of Execucom Systems Corp.

More information about the conference can be obtained from Maryam Alavi at the Department of Systems and Strategy, College of Business Administration, University of Houston, Houston, Texas 77004.

IBM's LADT Petition Stirs Opposition, Support

By Phil Hirsch
CW Washington Bureau

WASHINGTON, D.C. — IBM's petition asking the Federal Communications Commission (FCC) to declare Local Area Data Transport (LADT) an enhanced offering [CW, July 11] has provoked spirited opposition recently from the Bell operating companies and strong support from their competitors.

LADT is a new network accessing scheme that enables a conventional analog local loop to support a second, digital data circuit that has a transmission rate of up to 4,800 bit/sec.

LADT employs a black box at the subscriber's end of the local loop, which the Bell operating companies maintain is a multiplexer, but which their competitors contend is customer premises equipment.

According to the FCC's Second Computer Inquiry Decision, customer premises equipment — terminal equipment — and enhanced services can be offered by AT&T or a Bell operating company only through a separated subsidiary on a nontariffed basis.

Bell's competitors favor this approach because it reduces the chance of surreptitious cross subsidies between the regulated and nonregulated arms of AT&T.

The Bell operating companies pointed out in their recent answer to IBM's complaint that "the commission has specifically found that multiplexing equipment used to deliver multiple channels to a customer is not customer premises equipment."

However, the Independent Data Communications Manufacturers Association (IDCMA), which represents several major modem manufacturers, said in a recent statement to the FCC that Bell system technical manuals are "replete with references to the NCTE [network channel terminating equipment] that AT&T regards as 'integral' to LADT." NCTE is one type of wideband channel interface that the FCC, in a recent decision [CW, June 20], explicitly classified as customer premises equipment.

Largely because of these technical references, IDCMA concluded that the terminating LADT device is customer premises equipment, and the offering must, therefore, be marketed through a separate subsidiary.

Second Bone of Contention

The second major bone of contention is whether LADT performs protocol conversion. If it does, it is an enhanced offering, according to the FCC decision.

LADT employs either a two- or three-level protocol. IBM said it is three levels, maintaining that one level is added by the Bell operating companies and, therefore, LADT includes protocol conversion.

The Bell operating companies said the third layer performs only intranetwork functions, is stripped off at the exit node and, therefore, satisfies the FCC requirement that any messages transmitted by a Bell operating company must employ the same protocol on the I/O links.

GTE Telenet Corp. said LADT access circuits should be tariffed separately from end-to-end LADT service so that non-Bell carriers could employ them. The underlying technology appears to be applicable to "a wide variety of data communications services," the company added.

The Association of Data Processing Service Organizations, Inc., which represents the nation's major computer service bureaus, thought the commission should "issue a definitive interpretation of the [Second Computer Inquiry Decision's] rules . . . Such an approach would be the most effective way of addressing the many issues relating to protocol conversion that are likely to proliferate as new services are introduced."

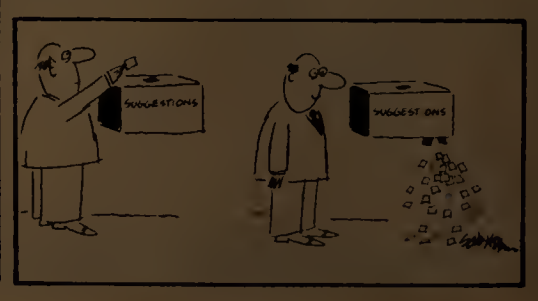
Pair to Receive DPMA Award

PARK RIDGE, Ill. — Paul M. Pair, said to be the founder of the first privately owned data processing school in the U.S., has been selected as the 1983 recipient of the Distinguished Information Sciences Award from the Data Processing Management Association (DPMA). The announcement was made by DPMA International President J. Crawford Turner.

Presentation of the award to Pair will be made Nov. 2 during the DPMA's International Conference and Business Exposition in Baltimore.

Pair, 85, founded in 1957 the first accredited private DP school, the Automation Institute of Chicago. The school was purchased by Control Data Corp. in 1968; Pair continues to serve as its senior education consultant.

Pair was director of two business schools in Chicago before founding the Pair School of Business in 1952 and the Automation Institute five years later. He has served on various association boards.



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Expected in November

AT&T's Cellular Radio Nears Commercial Use

By Katherine Hafner
CW Staff

CHICAGO — The nation's first commercial cellular radio system is expected to be operational here in November.

The cellular system, which will be operated by AT&T's Advanced Mobile Phone Service (Amps), has completed its final phase of testing. It now awaits "the last pieces of the regulatory puzzle" before it is made commercially available, according to Katie Harriss, an AT&T spokeswoman.

Hailed as "the mobile telephone of the future," cellular radio works by means of a series of cells, each containing its own low power transmitter and computer controller [CW, May 30].

Unlike existing mobile telephone networks, where a channel can handle only one call at a time, separate cells allow a number of calls to be handled simultaneously in the same frequency band.

As the signal weakens in one cell, it is picked up by a transmitter in the next cell without interrupting the signal.

"Engineering-wise, the system is operational," Harriss said. "Now we're waiting for our covering license from the Federal Communications Commission and an Illinois state Certificate of Public Convenience and Necessity. After that, we file a tariff, and then we can go into service."

According to Harriss, Amps in Chicago has a healthy lead on other U.S. cities planning cellular radio systems. Los Angeles and Miami are expected to be the next two cities to go into service, but Harriss does not expect them to be operational before mid-1984.

The Chicago system will cover the entire metropolitan area, with 17 individual cells encompassing about 2,500 square miles, Harriss said. The market for cellular radio, which has been hailed as the mobile telephone of the future, ranges from "chief executive officers to sales representatives . . . or anyone on the road," she added.

But cellular radio is a technology that does not come cheaply. The Chicago system, which will eventually handle some 100,000 users, will cost $50/mo for each line. During peak usage hours — from 7 a.m. to 7 p.m. Monday through Friday — calls will be 40 cent/min; off-peak calls will cost 24 cent/min.

The equipment for the system will be supplied by OKI Advanced Communications of Hackensack, N.J., which will carry the Amps brand name, and Motorola, Inc. Sales and rental, phone service subscription and number assignments will be handled by Chicago Communications Service, Inc. and Chicago Mobile Telephone Co., both of Chicago, and Metrocom of Schaumburg, Ill.

Newsletter Out On System/36

MAITLAND, Fla. — Scope Publications, Inc. has announced its latest newsletter, "Scope/36," for users of the IBM System/36.

Published monthly beginning in September, the newsletter reportedly will focus on all areas of the System/36. Features for experienced programmers will include a program of the month, tips and techniques for OCL, RPG II and utilities, as well as technical discussions of all facets of the computer.

Also offered will be operating hints for the nonprofessional and a Contact column where readers can get in touch with each other. This service is available at no charge to subscribers offering or requesting software.

Subscriptions cost $59 anually. A sample copy of "Scope/36" can be obtained from Scope Publications, which can be reached through P.O. Box 1252, Maitland, Fla. 32751.

Aid for Disabled Subject of Meet

MINNEAPOLIS — A national conference sponsored by the University of Wisconsin on the use of computers to help disabled people will be held at the Leamington Hotel here Sept. 12-14.

"Discovery '83: Computers for the Disabled," will feature a blend of vocational rehabilitation and special education.

It will provide teachers, administrators, counselors, government personnel, researchers, computer technologists and disabled persons with an opportunity to learn of advances in computer technology relating to the disabled, conference sponsors said.

The conference registration fee is $175.

Further information is available from the Office of Continuing Education, University of Wisconsin-Stout, Menomonie, Wis. 54751.



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Hot Summer a Sign of Success for Forecasters

By Tom Henkel
CW Staff

WASHINGTON, D.C. — While many have cursed the record-breaking heat which has plagued much of the U.S. this summer, government weather-watchers are happy because they predicted it. Their success in summer weather prediction followed a so-so record of forecasting for the winter months.

The computer-generated 90-day forecasts of temperature and precipitation activity in the U.S. have been highly accurate for the spring and summer, according to Robert Libezey, research coordinator for the Prediction Board of the Climate Analysis Center of the National Meteorological Center here.

Predictions for August, September and October show a 50% chance that the eastern third of the U.S. will continue to have above-normal temperatures. That does not, however, mean the heat wave is going to continue.

Furthermore, the Pacific Northwest and Southern California will also experience above-normal temperatures, and the mid-continent states, Northern Plains states, Great Lakes region and New England regions will experience below-average temperatures, according to Libezey.

The Southeast is expected to experience above-normal temperatures through October, added Bob Dickson, a meteorologist with the National Meteorological Center.

Checking the Forecast

Libezey is currently gearing up to compare this summer's computer-generated summer forecast, made in late May, with actual temperature and precipitation data for the season. Barring a dramatic drop in temperature and increase in precipitation, the summer forecast will be accurate, he said.

While Libezey noted that current forecasting methods make it impossible to predict extremes, such as a record-breaking heat wave, the center's spring and summer forecasts have been right on target — that is, if you consider broad statements like: "above normal" and "below normal" to be indications of pinpoint accuracy. According to Libezey, the past two quarters have represented better than past predictions.

What has happened to make the forecasts more accurate? Libezey is quick to admit he does not know. It may be that years of researching weather patterns and fine tuning of computer models is finally paying off. It could also be dumb luck.

Every three months, the center uses North American Air Defense IBM 360/195 processors to run seasonal models to predict weather trends for the next 90 days. While the process remains fairly constant, the models used for each season are somewhat different. Therefore, a few good seasons (in the statistical sense) do not necessarily mean the center has improved its models. In fact, it can take years to determine whether model changes have an impact on their accuracy, Libezey said.

Who Does It Benefit?

How does the 90-day forecast help the average American? Well, it doesn't. Libezey said the long-range forecasts are not the kind of things people can use to plan a picnic or vacation. The forecasts only predict the average temperature and precipitation for a three-month period. In other words, it could snow on the day of your family reunion, even though the long-range forecast might call for above-normal temperatures.

Where the long-range forecasts come in handy are for people involved in seasonal businesses. For example, a firm that ships coal could use the quarterly forecasts to determine how much coal to ship for the winter months.

Basking in the glory of a good six-month track record, the center will wait another week before making its 90-day fall forecast.

Common Schedules Fall '83 Conference

PHOENIX — Common, an IBM user group representing over 2,200 worldwide installations with machines ranging from the Personal Computer to the 4300 series of mainframes, will hold its Fall '83 conference here on Oct. 22-26 at the Phoenix Hilton Hotel.

The four-day conference will offer 170 sessions featuring speakers from both the user community and IBM discussing the latest data processing trends in systems, applications and management, according to conference officials.

Besides 4300 and Personal Computer users, users of the System/3, System/34, System/36, System/38, 5280, 1130, 1800, 5100 series, 5520, Series/1, Datamaster and Displaywriter will also be represented at the conference.

Along with the above seminars, a series of sessions developed in conjunction with Northwestern University that deal with professional development will be conducted.

The price of the conference for Common members registering before Oct. 10 is $100; after that date, the cost is $130 for members. For nonmembers, the registration fee is $160 until Oct. 10 and $180 to register after that.

Additional information on the user group meeting is available from Common, located at Suite 1717, 435 N. Michigan Ave., Chicago, Ill. 60611.



Job Calls for Interpretive Skills

Exec Credits Success to People-Blending Skills

By Katherine Hafner
CW Staff

ELMWOOD PARK, N.J. — James L. Zahner not only knows where his talents lie, he knows how to use them in his climb up the corporate ladder.

The recently named corporate senior vice-president in charge of management information systems (MIS) and logistics for the Grand Union Co. has never doubted that his strength is in "blending together technical people, who often have difficulty communicating with management, and management, who have difficulty working with technical people."

Zahner thinks his job is similar to that of directing a stage play. "It's like bringing actors together and creating a finished product that's enjoyable for everyone," the 53-year-old Zahner explained in a recent interview.

This is not to say that Zahner knows nothing of computers. On the contrary, he has been working with computers since their beginnings.

Zahner got his start in the field as a high-school student, when he worked summers at Diebold, Inc. in Ohio as an operator of IBM tabulating machines. He received his undergraduate degree in business with a major in accounting from Miami University at Oxford, Ohio, in 1952 and went on to receive a master's in accounting from Ohio State University.

When Zahner finished graduate school, he turned down a job offer from IBM to work for the Glidden Co. in Cleveland as a field auditor. When he was transferred to Glidden's Durkee food division in 1958, he oversaw the installation of the company's first computer.

Best as 'Catalyst'

In subsequent jobs, where he undertook similar responsibilities, Zahner came to recognize that he was best at acting as a "catalyst and a manager," leaving the technical expertise to others. "I couldn't write a program if my life depended on it," Zahner commented. "I always knew I wanted to do some sort of management."

As Zahner sees it, the job of a DP manager means interpreting the needs of a business and determining the tools needed to manage it. So successful was Zahner at doing this that when Grand Union Co. acquired Atlanta-based Colonial Stores, Inc., Zahner got an assignment in England to help a sister chain, Allied Suppliers Ltd., do a "bit of grass roots retraining." As vice-president of management information, Zahner helped the chain of 900 supermarkets throughout England and Scotland install entirely new IBM equipment and integrate the entire



James L. Zahner

computer services division with the rest of the company.

In June of this year, Zahner returned from England, and 24 hours later he assumed his new post in Elmwood Park. Grand Union Co. employs 31,000 people and operates 610 stores in 15 states and the Virgin Islands.

"This job is a bit different from the others I've held," Zahner said. "The vice-president of MIS reports to me, and so does the vice-president of warehousing and distribution. So I'm spread a bit wider with the responsibility for tying our company's warehouse and transportation operation together with computer services."

It all "makes sense," Zahner said, considering the grocery retail business of receiving and planning orders, getting them into the warehouse at the right time, purchasing and delivering stock to stores and accounting for its sale.

Zahner expects to remain detached from the actual equipment and "whether it's working well at midnight. I have very capable people who free me up to be planning ahead to determine our needs."

Because the job was created recently and Zahner is the first to fill it, much of what he does depends on his own creativity, while he believes strongly in remaining accountable to the chairman of the board.

"You can suggest a computer solution to a problem, but half the time you can see that a computer solution isn't necessarily the best way to handle the problem," Zahner said. "In many cases there's a good pencil or commonsense solution. You don't get that flavor if the top computer person isn't reporting to the top corporate level.

"If DP is done well and if those of us in it have a broad enough education, then we can manage the job correctly," Zahner said.

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After Two Uneventful Years

Mini User Reports Same Strange Problems

By Peter Bartolik
CW Staff

PITTSBURGH, Pa. — After two successful years using Wang Laboratories, Inc.'s word processing equipment, a division of Westinghouse Electric Corp. here recently experienced some strange problems.

For example, the VS 100 system the firm purchased late last year has "been losing some data, and it has been going down quite a bit," said Diane Lee, manager of Specialized Office Services (SOS) at Westinghouse's Gateway Center complex here.

Adding a 1M-byte memory board to that system was also more trouble than expected. It was ordered this January but, as Lee explained, it "was several months before the board got here."

Shortage of Boards to Blame?

Tom Hayes, Wang's account representative in Pittsburgh, agreed that his company "slipped up a little on delivery," blaming the problem on a shortage of boards "at that particular time." However, he claimed that Westinghouse shared responsibility for the delays because an internal reorganization stalled approval of a purchase order that also included a conversion from rental to ownership.

Gateway Center encompasses a number of Westinghouse's operating companies, including Power Systems, Public Systems, Industry Products, corporate staff, a broadcasting subsidiary and international and credit operations. About 1,000 of Westinghouse's 140,000 employees work here.

Lee was a member of the task force that selected Wang equipment more than two years ago for the firm and later replaced it with another Wang system because her department expanded.

"We have consistently been able to improve productivity and provide more effective services through computerization," she said recently.

For its second Wang system, installed late last year, Westinghouse selected the Wang VS 100 combined processing unit.

The system has been modified since installation and now has 2M bytes of memory, two 300M-byte Control Data Corp. disk drives and one 75M-byte Wang disk drive. It includes 46 workstations, 14 printers — reduced from 19 with the acquisition of two Wang laser printers — and a Xerox Corp. 5700 printer that is interfaced with software produced by LBM Software Co. of New York.

While satisfied "overall" with the system and what it has accomplished, some problems have "caused more downtime than I would like," Lee said.

Downtime problems were directly attributable to the "overloading" of the system on just 1M byte of memory, Wang's Hayes said.

The new board was delivered several weeks ago and, he claimed, remaining problems have been resolved by recently upgrading the operating system to Wang's Version 5.30.

Lee agreed "partially" with Hayes' observation on the purchase order. She conceded that paperwork was delayed, but added that three shipment dates were missed after the purchase order was finally processed.

Representatives of Wang's distribution division were not available to comment directly on the delay, but spokesman Rich Schulman said from corporate headquarters in Lowell, Mass., that the problem was attributed to a breakdown in communications, complicated by the large number of orders from various Westinghouse divisions, and was an isolated incident.

Problem of Lost Data

Stressing that she is content to resolve outstanding issues "one-on-one" with Wang, Lee nonetheless observed that "we are still having some problems. When the system went down, Lee said, data was lost from documents on which personnel were working at the many on-line terminals.

"We lost some data when it was backing up; it gave us some prompts it was doing it properly and it wasn't," she added. With the newly installed operating system version, "I'd like to believe that's not going to happen again."

Other than the memory board and downtime problems, Lee said the experience with Wang has been mainly positive.

In 1979, management decided that office operations needed some upgrading. A volunteer task force of 30 secretaries from the Power Systems and Industry Products companies analyzed operations on three floors of the headquarters building. Problems in both time and space utilization were discovered.

"Some secretaries were overburdened while others were bored," recalled Lee. "But with the help of computerization, we were able to create a whole new concept in office services."

Lee's department has established three centers on three floors of the Gateway Center and has 400 users. SOS processes more than 15,000 pages of copy monthly.

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Estrin Named Chairwoman Of Infocom '84

HOLMDEL, N.J. — Judith L. Estrin, vice-president of engineering at Bridge Communications, Inc., has been appointed general conference chairwoman of Infocom '84, a conference sponsored by the Institute of Electrical and Electronics Engineers.' John W. Wong, associate professor of computer science at Canada's University of Waterloo, has been selected as technical program chairman.

The Infocom conference will be held April 9-12 at the Cathedral Hill Hotel in San Francisco.

Estrin holds a BS degree in mathematics and computer science from the University of California at Los Angeles and an MSEE degree in computer engineering from Stanford University. She is the founder of Bridge Communications, an active member of the IEEE 802 committee on network standards and the author of several papers on local networks.

Wong holds a Ph.D. degree in computer science and worked at the IBM Zurich Research Laboratory from 1981 to 1982 while on sabbatical from the University of Waterloo. His research interests include modeling and analysis of computer systems, computer networks and communications protocols.

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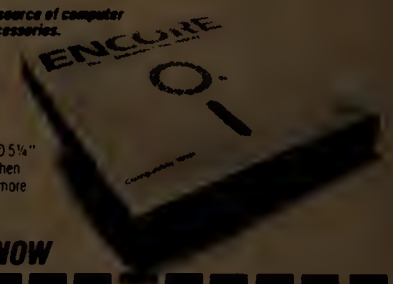
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	7961	8" SSSD soft sector IBM format 2305830	$32.90 ($3.29 ea)	$24.90 ($2.49 ea)	$19.90 ($1.99 ea)

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The flight deck layout for the Boeing 767 airliner is a far cry from the dial-cluttered cockpits of yesteryear. Two central CRTs provide readouts from the flight management computer system. The pilots can call up engine information on the keyboards immediately below.

Airborne Automation on Boeing 757, 767 Takes Over Flying, Landing, Making Pilot 'a True Manager'

By Paul Gillin
CW Staff

MIAMI — When the Wright Brothers landed their motorized box kite at Kitty Hawk, N.C., 80 years ago, they never imagined that task and thousands more would one day be presided over by a machine.

But computer technology on the new Boeing Co. 757 and 767 aircraft has made the manual functions of flying and landing an airplane virtually obsolete. If he desires, a pilot now needs only to get the craft airborne. Once aloft, computer circuitry can take over, flying the plane to its destination at the optimum speed, landing and approaching the terminal without human intervention.

In other words, automation has made the pilot "a true manager," a Delta Air Lines spokesman observed.

The bewildering array of dials and meters that once filled the cockpit has given way on the new planes to a comparatively uncluttered display centered around CRT screens that provide readouts of nearly any information short of the in-flight meal's menu. At the heart of the Flight Management System developed by Boeing is the Flight Management Computer (FMC), which carries out flight planning and navigation and monitors conditions aboard the aircraft.



Built-in test equipment on the Boeing 767 has reduced maintenance to an average of one maintenance man-hour per hour of flight, Boeing claims.

The FMC's navigation data base can store an airline's entire route structure. If the weather ahead looks bumpy, the pilot can call up the flight's progress along the flight plan and key in changes on an alphanumeric keyboard. An alternate flight plan including holding patterns can be stored along with cost profiles that show the effects of air speed on fuel consumption.

If desired, the pilot can set the plane to fly itself in the most fuel-efficient mode. The computer will maintain the ideal speed, adjusting automatically to compensate for environmental conditions.

The flight deck also features a monitoring system that consolidates over 40 mechanical dials into a single-screen display. The Engine Indication and Crew Alerting System (Eicas) continuously displays flight information needed for normal operation on one CRT. It also monitors over 400 inputs from engines and subsystems and signals an alert if a problem is detected.

Other CRT displays include the Attitude Director Indicator and Horizontal Situation Indicator, which present in a single-color display the attitude and position information that once filled a bank of meters. The Horizontal Situation Indicator integrates compass, track, weather and map references into a single display; it also incorporates color weather radar similar to that used by many television stations.

Despite the aircraft's price tag of about $40 million each, Boeing has already sold more than 300 of the 757s and 767s. A Delta spokesman said the extra expense of the high-tech hardware will be made up through increased efficiency.

Delta airlines has proceeded with its plan to purchase 42 of the 767s. "It was a pretty tough decision, but increased efficiency, economy of operation and overall performance of the fleet will make that cost burden of buying the new equipment justified in the long run," Delta spokesman Bill Berry said.

He added that "the cost [of the 767] is higher than the [larger Lockheed Corp.] L-1011, but our experience shows that the airplane is slightly more than 30% more efficient to operate than the [Boeing] 727, which was the closest thing in size." If planned purchases are completed, 767s will eventually comprise nearly 20% of Delta's fleet.

'Pilots Love It'

"The pilots love it," Berry said. "They love the rapid ease of reading information, and they are relieved of the burden of doing the very menial tasks. [The computer system] frees them to give more consideration to the safe performance of the airplane, not tie them down with some of the computations that were required."

Airline mechanics, too, have gained from the new technology, Berry noted. Built-in test equipment on the aircraft detects, isolates and verifies equipment failures. Most of the flight deck components are modular and can be replaced without the need for retest.

Boeing claims the test equipment is capable of isolating a fault on the first attempt at least 95% of the time and that an average of one maintenance man-hour per hour of flight is required.

International Report

FROM THE CW INTERNATIONAL NEWS NETWORK

BRAZIL

SAO PAULO — Brazil's Secretary of Industry and Commerce, Camilo Pena, voiced his support for nationally controlled joint technology ventures when he spoke recently at the country's First National Congress of Industrial Automation. During the same event, however, Danilo Venturine, the special secretary for land-related subjects and general secretary of the National Security Council, took issue with Pena. "Our doors cannot be closed to foreign cooperation," Venturine said.

JAPAN

YAMATO — The joint venture company of Fujitsu Ltd. and Matsushita Electric Corp., called Panafacom Ltd., is doubling the production of its personal computer. The PFC-280 was introduced last April to compete with the IBM 5550 Personal Computer and can function as a Japanese word processor, as a terminal linked to a host system and as a stand-alone personal computer. A Panafacom spokesman said the production increase reflects an intention to keep up with IBM in terms of sales volume and market share.

YOKOHAMA — Matsushita Communication Industrial Co., Ltd. has introduced equipment that reportedly recognizes an individual's speech in several different languages, including Japanese, English, German and French. The product is called Panavoice JH-600 and costs approximately $600.

TOKYO — The Nippon Computer Graphics Association was recently established here to coordinate research and development efforts in the field of graphics technology. Dr. Isamu Yamashita, chairman of the Mitsui Engineering and Shipbuilding Co. Ltd., was named chairman of the new association.

TOKYO — Magicsoft Japan Co. Ltd. has been established here as a 100%-owned subsidiary of Magicsoft U.S.A. The firm manufactures business software as well as game software. Robert Sauer, president of the Japanese company, anticipates first-year revenues of $3 million.

TOKYO — Hitachi Ltd. said it has become aware of 64K-byte dynamic random-access memories (RAM) masquerading under the Hitachi trademark in the UK marketplace. Hitachi discovered the fake RAMs when they were rejected by a number of customers who said the RAMs failed to work properly and were causing significant operating problems. The fake RAMs are easy to distinguish from real Hitachi products because the pins are silver-plated instead of solder-dipped, and they do not bear the twin-mould-ejector marks of the Hitachi devices, the vendor said.

SWEDEN

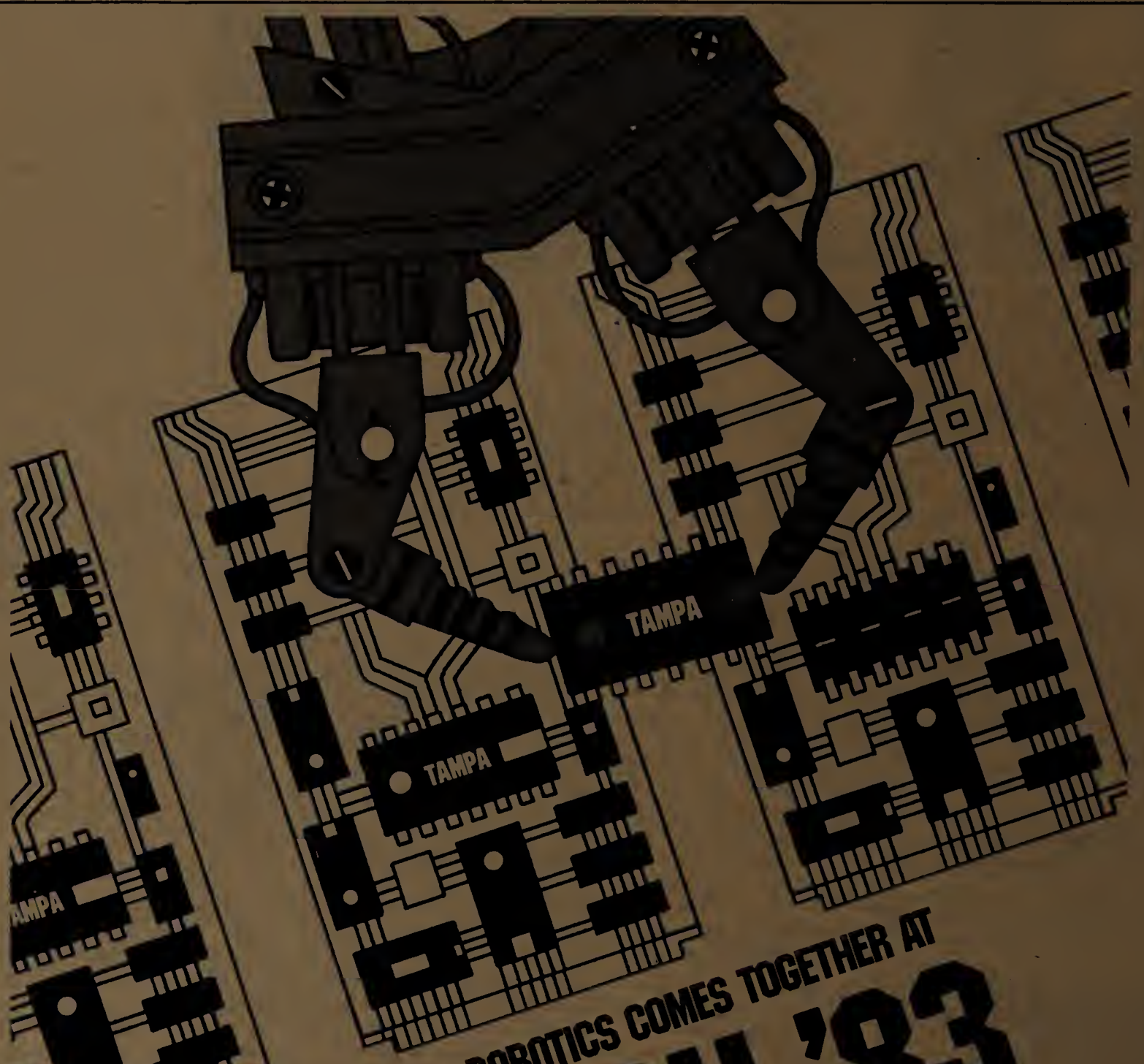
STOCKHOLM — Gadelius A.B. has been selling robots to an unlikely customer: Japan, the world's foremost robot manufacturer. So far, 30 robots, valued at roughly $1.5 million, have been sold to Japan since the end of last year. The Swedish robots, which cost about $128,000 each, are multipurpose machines, as opposed to the Japanese single-task robots, and handle a variety of difficult tasks, including wielding a 138 lb. tool accurately into position within half a millimeter. Gadelius is planning to build a factory in the city of Kobe, Japan.

STOCKHOLM — Mats Gabrielsson, managing director of Datatronic, one of Sweden's leading software companies, announced plans to move the company's main operations to the U.S. to protest a government proposal to impose new, stiff taxes on profits. Gabrielsson predicted that other Swedish companies will follow Datatronic's lead if the government goes through with the tax plan.

WEST GERMANY

MUNICH — Mainframe vendor Siemens AG recently announced "XA Capable" processors that claim to perform above the IBM 4300 series. The processors are made by Japan's Fujitsu Ltd. and modified by Siemens for the German market. The Models 7860 E, L and R are aimed at IBM's 3083 low-end machines, with main memory capacities of 4M to 32M bytes. They are equipped with up to 16 communications channels.





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Staring at CRT Distorts Color Perception: Trio

By Katherine Hafner
CW Staff

EVANSTON, Ill. — Stare at anything long enough and you're bound to go cross-eyed.

But stare at a CRT for hours on end and your color perception will be knocked out of whack.

This is what an architect, a physician and a psychologist here discovered by chance. After looking at a CRT screen for an extended period of time, white figures on a black background take on a pink hue. Depending on how long you stare at the CRT screen, this effect can last as long as several weeks.

Known in psychological circles as the McCollough effect, this harmless by-product of CRT use was noticed recently by Susan Greenwald, an architect using an IBM Personal Computer for word processing. She asked her husband Mark, an ophthalmologist, about it.

Mark Greenwald called a friend who happens to be a psychologist specializing in visual perception, and he unraveled the mystery.

"I routinely explain the McCollough effect in my lecture courses," said Randolph Blake, a professor of psychology at Northwestern University here. "The conditions under which the effect is produced have to be fairly constrained. But it just so happens that the green letters on the black terminal generate just this aftereffect.

"The most interesting thing is that the pattern of the color distortion conforms to the pattern and contour of the letters on the screen. That is, if you stare for a long time at a CRT, then see white letters on a black background that are of similar size and shape, you'll get the pinkish tint."

The effect is far from vivid, Blake explained, and can last anywhere from several minutes to several weeks.

"There aren't really a lot of instances where we read white letters on black," Blake conceded, "but sometimes company brochures and words on a book jacket have it."

Blake said that although the effect is physiologically harmless, it is important that physicians be aware of it in case they receive calls from worried patients.

Law Firm Establishes DP Group

BOSTON — A law firm here has established within it a group specializing in legal issues involving computers and other high-technology areas.

Brown, Rudnick, Freed & Gesmer's new Computer and High Technology Law Group will concentrate on legal questions involving computers, software programs and data bases and pertinent questions in related technologies such as bioengineering, cryogenics, lasers, robots, medical engineering and fiber optics.

Roy N. Freed, author of the 1960 article "A Lawyer's Guide Through the Computer Maze" and *Computers and Law, A Reference Work*, has been brought in to head the new group, according to the announcement by senior partner Matthew Brown. A graduate of Yale University and Yale Law School, Freed is a founder, director and past president of the Computer Law Association; a member of the Association for Computing Machinery; and a member of the American Bar Association's Section of Science of Technology.



NCR COMTEN'S NEW MODEMS
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NO NEED FOR 3.



NCR

Managers on the Move

ROBERT J. KOHLSTEDT has been promoted to vice-president of management information systems (MIS) at Interstate United Corp. in Chicago. He will be responsible for all of the company's data processing activities, including systems development, programming and computer operations.

Previously, Kohlstedt was director of MIS at the Chicago-based national food services management company.

Before joining Interstate United in 1980, Kohlstedt was director of information systems for Union Special Corp. in Chicago.

Kohlstedt attended Northwestern University and the University of Chicago, where he received a certificate in advanced management.

•••

JAMES R. STEELE has joined Harte-Hanks Communications, Inc. as manager of its corporate data center in San Antonio, Texas.

Steele went to Harte-Hanks from Bendix Corp., where he was operations manager of the corporate data center in Ann Arbor, Mich., for 2½ years. He has more than 12 years of data processing experience.

Steele holds a bachelor's degree in management from Oakland University and has done graduate work toward a master of business administration degree at Eastern Michigan University.

(Continued on Page 21)



Robert J. Kohlstedt

Cullinet Sets User Weeks This Fall

WESTWOOD, Mass. — Schedules and formats for its annual Domestic and International User Weeks were recently announced by Cullinet Software, Inc.

The Domestic User Week will take place in New Orleans Oct. 2-6. The International User Week will be held Nov. 6-10 in Monte Carlo, Monaco.

Events will focus on education and information exchange through courses, enhancement sessions, special interest discussions, user presentations and informal workshops. Also featured will be The Demonstration Center, demonstrations of various Cullinet products. Keynote speakers will be named later, a spokesman said.

Cost of the conferences will be $400. Information is available from Cullinet Software, 400 Blue Hill Drive, Westwood, Mass. 02090.

Marietta Schedules Users Meet

PORTLAND, Ore. — A semiannual users group meeting has been scheduled here for Aug. 31 to Sept. 2 by Martin Marietta Data Systems, Inc., a division of Martin Marietta Corp.

The keynote speaker will be Tom Gunn, manager of Arthur D. Little, Inc.'s Computer Integrated Manufacturing Group. Gunn will address emerging manufacturing technology and its impact on manufacturing in the future.

Plant tours have been scheduled at Tektronix, Inc. and Electro-Scientific Industries, two users of Martin Marietta's MAS-Manufacturing software product.

Registration is free to MAS users and includes plant tours, exchange sessions, conference materials, breakfast and lunch with guest speakers and a buffet social.

Additional information can be obtained from Martin Marietta Data Systems, Marketing Services, located at 6303 Ivy Lane, Greenbelt, Md. 20770.



Managers on the Move



James R. Steele



Allan D. Breyer

(Continued from Page 20)

ALLAN D. BREYER has been elected to the newly created position of first vice-president of First Federal of Michigan. He will manage the firm's MIS department.

Breyer was previously a vice-president and acting controller and manager of computer systems for First Federal.

Breyer has been an employee of First Federal since 1964. He is a 1962 graduate of Lawrence Institute of Technology in Southfield, Mich.

•••

DENNIS CREIGHTON has joined Zurich American Insurance Co. as manager of data services support in Schaumburg, Ill. He will be responsible for all data processing hardware and software.

Prior to joining Zurich American, Creighton was manager of software support for Brunswick Corp. for four years.

He also served as senior systems programmer for two years with Wilson Sporting Goods.

•••

MICHAEL N. HOFMAN has been named director of management information services for French Hospital Medical Center in San Francisco. He will provide leadership in the selection and development of a data processing system for the rapidly growing health plan and outpatient department.

Before joining French Hospital, Hofman was director of information systems at Mercy Medical Center in Denver.

Hofman received his M.S. in health administration from the University of Colorado.

•••

JOHN A. BARNARD has been named manager of systems and programming for the MIS division at General Development Corp. in Miami. In his new position, Barnard will direct 21 people in MIS systems development.

Prior to his promotion, Barnard was General Development's supervisor of systems and programming in MIS.

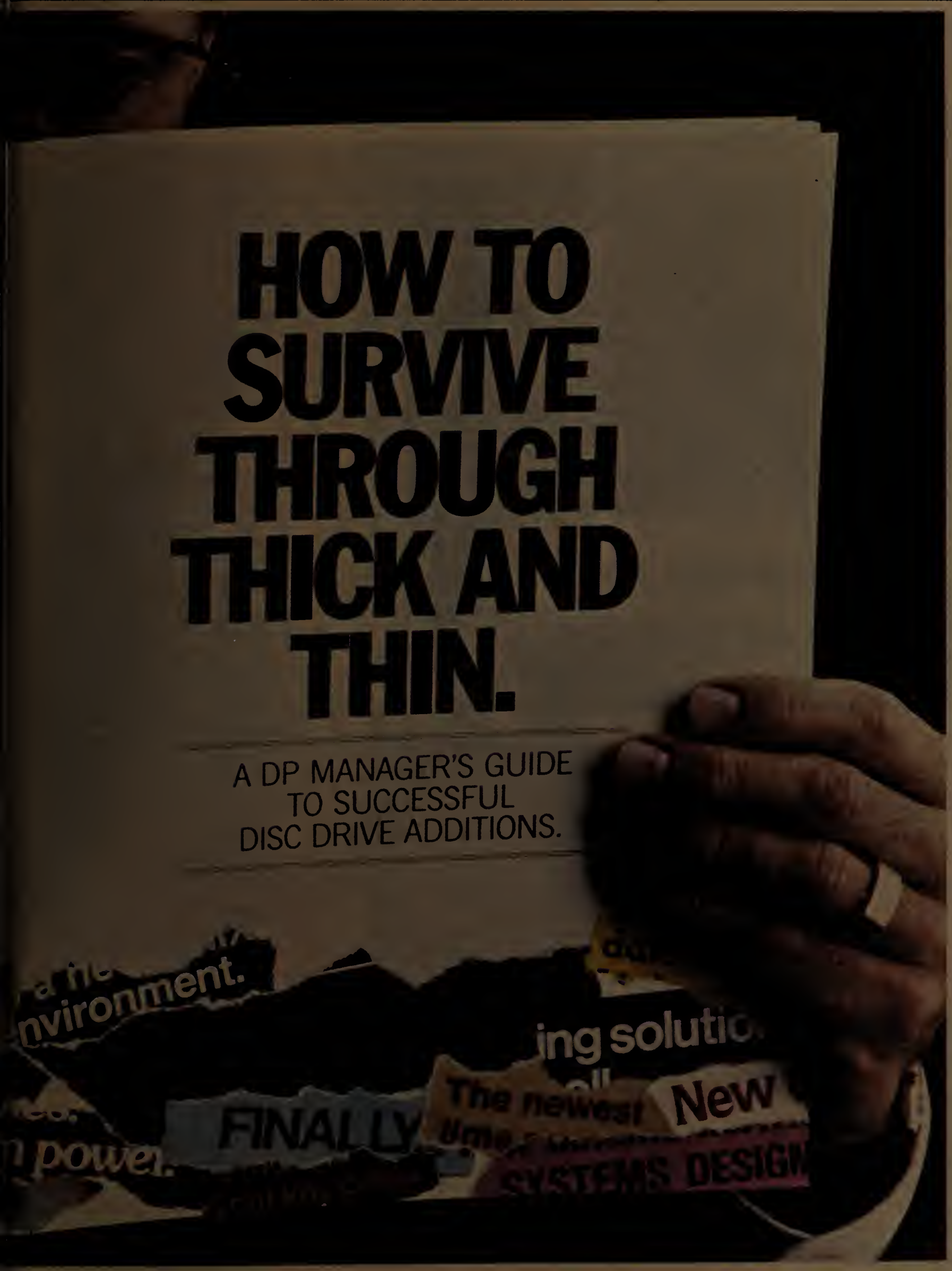
Barnard attended the University of Miami and has completed a number of courses in programming, project control and systems development at Florida Technical College and Florida International University.

•••

PAUL L. CARSON has been promoted to vice-president of management information services for Parker Hannifin Corp. in Cleveland. In his new position, Carson is responsible for companywide information systems development and processing.

Previously, he was corporate director of management information systems for Parker Hannifin, a supplier of components for fluid systems in industrial, automotive, aviation, space and marine markets.

Carson holds a bachelor's degree from Cleveland State University and a master's degree from Case Western Reserve University.





Mini Models New Plants' Environmental Impact

FORT WORTH, Texas — For Bud Chaffin, obtaining permit approvals for plant expansions or construction of new facilities used to mean an exhaustive ordeal of preparing and processing required environmental information. His job has been made much easier thanks to a minicomputer that can prepare environmental report data from models.

Chaffin is coordinator of environmental technical services at Champlin Petroleum Co. here. In addition to preparing detailed environmental impact reports, Chaffin is required by the Environmental Protection Agency (EPA) to build numerous atmospheric dispersion models. The models are detailed, simulated predictions of the pollutants that would or could be emitted from a plant and their projected concentrations and motion through the atmosphere.

Before installing a minicomputer to handle the simulations, Chaffin said he had two ways of getting the EPA data. He could rely on his company's IBM mainframes and DP personnel for the simulations; or he could hire an outside consulting service to process the models and prepare the reports and related graphics. Chaffin said both methods were time-consuming, error-prone and very expensive.

"Relying on in-house personnel or an outside source for information processing were both very frustrating because there was no real control, no sense of urgency and no first-hand familiarity with the problem at hand or its criteria," Chaffin recalled.

Early in 1981, Chaffin decided to look for his own system to process the EPA-mandated models. This, he concluded, would give his staff hands-on control of their DP operations. It also would give the department immediate editing and revision capabilities.

At the same time, Champlin Petroleum had decided outside consultant costs, additional company DP expenses and the associated expenses attributed to delays and errors were too high. Chaffin said the firm felt the price of using a consultant or using in-house DP personnel far out-weighed the cost of a stand-alone system.

Chaffin chose a system developed by Form & Substance Corp. of Westlake Village, Calif., which consists of a 16-bit Naked Mini 4/95 minicomputer from Computer Automation, Inc. The processor is equipped with 128K bytes of random-access memory, a video display terminal with three-dimensional graphics capabilities for developing effective visual interpretations of the models, a printer and floppy or hard disk storage of up to 40M bytes and a complete software library of EPA models.

As Design Tool

In addition to preparing EPA models, Chaffin said Champlin Petroleum uses the Form & Substance system, called the IM-1, as a design tool for simulating and predicting concentrations of pollutants at proposed plants. By using those findings, design engineers can build environmental safeguards into their plans.

An EPA siting report for a proposed plant or plant modifications requires up to 15 different EPA models, Chaffin said, depending on the terrain, prevailing wind conditions, kinds of pollutants being generated by a plant and many other measurable factors.

Champlin Petroleum has also been able to cut down on construction delays because Chaffin's department can get reports for permit approval processed in a matter of days, rather than weeks or months, he said.

Form & Substance is continuing to add new capabilities to its system. For example, a toxic spill and disaster program was recently developed for use in chemical processing plants. It pinpoints chemical spills, charts the concentration levels of pollutants and their effects on the environment and also provides instructions for evacuation and cleanup. Form & Substance is now positioning itself as a total environmental systems company, Chaffin said.



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Off the Press



MANAGING THE DATA BASE ENVIRONMENT
By James Martin

Yet another James Martin book enters the DP world this summer, this one ably encompassing the administration, design, application and end use of data bases. As customary, the author fills the pages with boxed-off real problems as told by real people up and down the DP ladder. At times this style disrupts the narrative, but mostly the real voices constantly remind the reader that Martin's accumulated wisdom on the data base environment grows out of listening to the problems.

Some Martin wisdom:

"Data base use is the key to flexible employment of companies and their transmission networks."

"Management needs to understand that data base systems have a long-term payoff."

"Because it is impossible to predict what information a top executive might need, the information generated by lower-level management should be made accessible, preferably via on-line systems, but should not be dumped on the executive's desk."

"One of the most important current developments in data base technology is the growth of high-level languages for data base users."

Hardcover, 766 pages, $49.95, ISBN 0-13-550582-8. Prentice-Hall, Inc., Englewood Cliffs, N.J. 07632.

MICROPROCESSOR SUPPORT CHIPS: THEORY, DESIGN AND APPLICATIONS
By T.J. Byers

The subject matter can easily be overlooked; in fact, for most people there is no overwhelming reason to learn about 100 microprocessor support chips. This little bit of hardware simply relieves the microprocessor of more mundane work and does it outside the view of most managers.

But this book lures the reader with large diagrams, attractive typeface and a well-structured format. Byers takes time to explain concepts tangential to the chips themselves. The sum of seven chapters on local-area network controllers for Ethernet tells as much about the network as about the controllers. The section on Winchester disk controller chip sets is laced with interesting asides, such as one explaining the origin of the name.

The book is aimed at systems designers who need a handy reference on support chips. Each chip is described on facing pages — text and pinout on one, the schematic on the other.

Hardcover, 224 pages, $38, ISBN 0-07-009518-3. Micro Text Publications, Inc./McGraw-Hill Book Co., 1221 Ave. of the Americas, New York, N.Y. 10020.

NEEDED: PROFESSIONAL MANAGEMENT IN DATA PROCESSING
By John J. Callahan

DP managers traditionally rise through the technical ranks and consider the management of technology their primary job responsibility. As for professional management — most say they don't have the time to study it.

And so, the author claims, DP departments are run by the Authoritarian, Militarist, Perfectionist, Politician or Technocrat. These management types lead as best they can, but their best is no longer good enough for data processing, Callahan says. What is needed is a promotional system that identifies those individuals who possess the character traits necessary to manage and not simply the skills to do their current job.

There are no revelations here about positive management traits (fairness, intelligence and so forth) or negatives (coldness, arrogance, selfishness). Callahan suggests use of graphologists, psychologists, trial projects, long-term observation and character trait tests to uncover management abilities in employees. He lampoons the corporate sacred cow — the performance evaluation — as an outdated tool claiming objectivity, which actually is a subjective measurement governed by the mood, attitude and style of the judging manager.

Hardcover, 206 pages, $25, ISBN 0-13-610956-X. Prentice-Hall, Inc., Englewood Cliffs, N.J. 07632.

Books of Note

TUTORIAL ON SOFTWARE MAINTENANCE, edited by Girish Parikh and Nicholas Zvegintzov. *359 pages, ISBN 0-8186-0002-0. IEEE Computer Society Press, Suite 300, 1109 Spring St., Silver Spring, Md. 20910.*

TELECOMMUNICATIONS REGULATION TODAY AND TOMORROW, edited by Eli M. Noam. *450 pages, ISBN 0-15-004294-9. Law & Business, Inc./Harcourt Brace Jovanovich, Publishers, 757 Third Ave., New York, N.Y. 10017.*

THE RISE OF THE COMPUTER STATE, by David Burnham. *273 pages, $17.95, ISBN 0-394-51437-8. Random House, 201 E. 50th St., New York, N.Y. 10022.*

Nielsen cable network product usage survey. NHI Sept. '82. Subject to qualifications, available upon request.

THE ESPN AUDIENCE HAS 40% MORE COMPUTER BUYERS. YOU'LL BE IN THE CHIPS.

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NETWORK SPORT SCH DULE 6 P ANN EMEN	250.0	32.3	100	26.8	83	27.3	85
NE WORK E PN NETWO K SP 8 PN ANNOUNC MEN	250.0	30.1	93	34.8	108	42.3	131

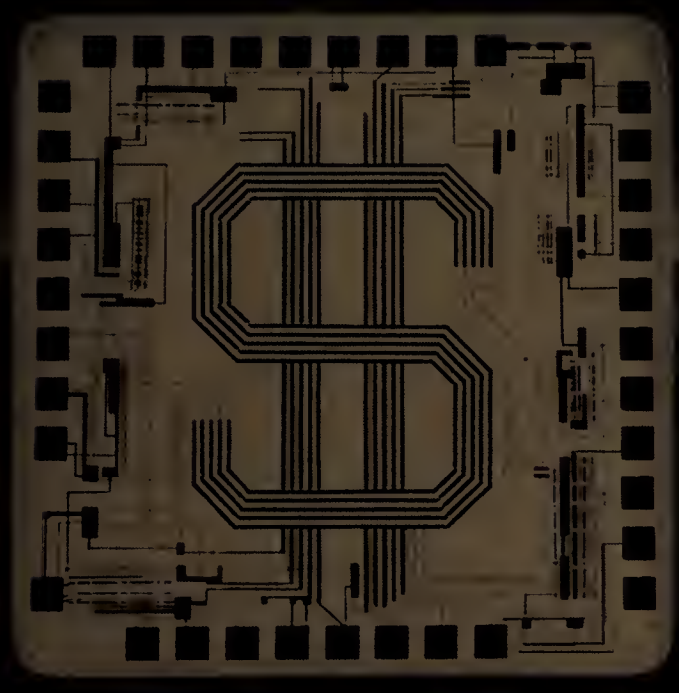
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Lags Cut From 15 Days to 15 Minutes

DDP Net Puts Brakes on Auto Bureau's Backlog

BATON ROUGE, La. — Automation brought record keeping up to date at the Driver Management Bureau (DMB) of the state Department of Public Safety here, but not quite up to the pace of the bureaucratic process.

With almost one million documents a year to process and an active file of 50,000 motor vehicle operator records for persons who have lost their driving privileges, the DMB in 1980 was a paper-bound manual operation that had become an administrator's nightmare with case backlogs, up to a 15-day lag in ordering license "pickups" and a costly inventory of 120 preprinted forms.

Under that outdated system, a court case file or an accident report was processed through seven different sections in assembly line fashion, and from one to two weeks elapsed from receipt of a new case to issuance of a pickup order for an operator permit and license tags.

Frequent Interruptions

The system was prone to frequent interruptions as case files were pulled from the processing line in response to telephone inquiries, court correspondence and other information requests.

Files were often misplaced, and law enforcement agencies would wait days or weeks for information on license suspensions and revocations.

State officials initially concentrated on word processing, but after studying the issue they instead decided on a distributed data processing system, according to Rex McDonald, assistant undersecretary for information services in the Department of Public Safety.

"The more we looked at it," he said, "the more we felt the need to make everyone a case evaluator and to automate important support functions such as typing, correspondence, data entry and file movement."

Seven months were spent developing and writing detailed functional specifications for the new DMB operation. "Our goal was to create a unit with the flexibility and resiliency necessary to handle our case load at current manpower levels, without overtime, administrative backlogs or additional personnel," McDonald recalled.

Those goals were met, despite the loss of 23 positions due to a budget cut, and the bureau claims employee skills have been upgraded and employee morale and work performance improved.

The department received three bids for installation of equipment manufactured by Wang Laboratories, Inc., Burroughs Corp. and Honeywell, Inc. Benchmark Computer Systems, Inc. was selected to design and implement a Honeywell Office Automation System in conjunction with Honeywell.

Benchmark, a Wisconsin company that has worked with Honeywell systems since 1979 and specializes in law enforcement applications, teamed its computerized central records application package with Honeywell's products to create a 90-terminal distributed data processing network.

The network is driven by paired DPS 6 minicomputers and controlled by Benchmark's on-line 6 transaction processor and Honeywell's Gcos 6 Mod 400 operating system.

Processors Upgraded

The system, McDonald said, has enabled the bureau to upgrade its former assembly line-like processors to evaluators. Personnel are able to call up information on court records and accident reports on which to base decisions and initiate correspondence without resorting to hard-copy files.

McDonald said all but seven of the original 120 preprinted forms have been eliminated, time lags for pickup orders for operator permits have been cut from 15 days to 15 minutes and case backlogs have been substantially reduced despite the personnel cutbacks.

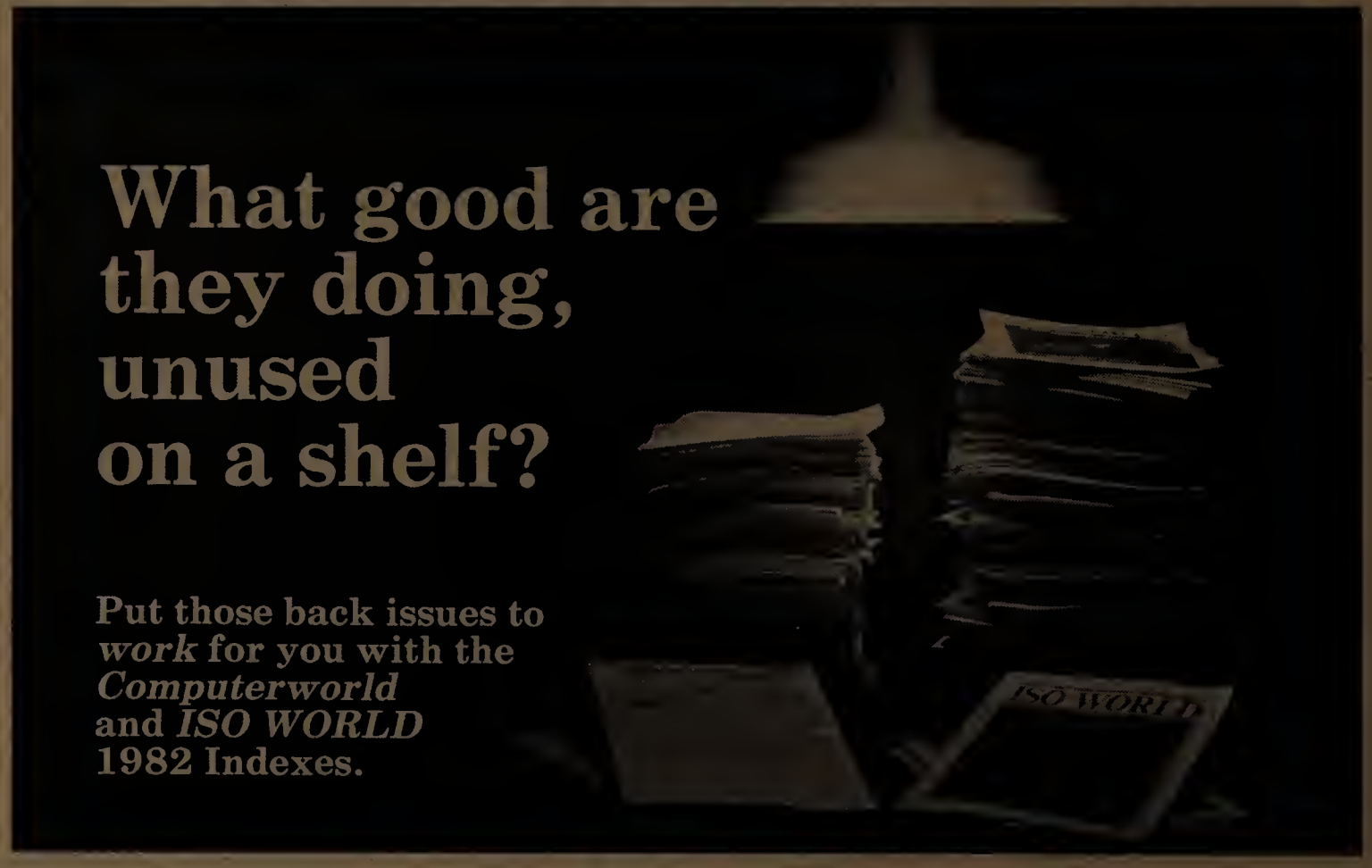
The system delivered by Benchmark "did everything the specs required," according to McDonald, but he added wryly that "our environment is dynamic, whereas the specifications are static."

On top of the seven months required to write the specifications, it required one year to implement the system, and it has been in full operation for one year now.

During that time, the state's legislative body has made several changes in statutes: Drunk drivers must now go through an administrative process with bureau hearing officers, and habitual offenders laws have been stiffened.

These are just two of the many changes that McDonald said has greatly increased volume and "changed the profile of the system."

"We have a list of needed enhancements about a mile long," McDonald said, adding that the department will handle the changes in-house.



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Index	Heading	# Entries
CW	Local Area Nets	70
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CW	Accounting Systems	101
CW	Disk Equipment	126
ISO	Dealers/Distributors	64
ISO	IBM-PC	84
ISO	Floppy Disks	51
ISO	Modems	45
ISO	Retail Stores	53

And that's a sample of just this year. We also have Indexes for *Computerworld* that go all the way back to 1976 and Indexes for CBN back to the first — (Nov. 1978-Dec. 1979)

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State Program Uncovers Odometer Tampering

SPRINGFIELD, Ill. — Some used cars up for sale are just too good to be true, and the Secretary of State's Office here is employing a computer to find out just which autos have more to tell than meets the eye.

State officials here estimate that odometers are illegally rolled back on about 15,000 of the 1.6 million used autos that are sold here each year. The practice can inflate the sales price by as much as $1,000 more than the true value.

This past January, Secretary of State Jim Edgar's office implemented a computerized inspection process for all new titles being issued. Officials have been reluctant to publicize details of the process, according to a spokesman, fearing that whatever "information gets out makes it that much easier for unscrupulous dealers to beat the system."

Reportedly, investigators from the Secretary of State's Office will present evidence later this month against five auto dealers who will be accused of tampering.

Officials were not able to provide figures on the number of tampering cases discovered by the computer program, but spokeswoman Ellen Feldhausen observed that "it is working."

Utilizing a Honeywell, Inc. DPS 5 mainframe computer and a software program written in-house, the Division of Motor Vehicles has accumulated a record of 16 million automobiles. When applications for new titles are processed, the program searches for several telltale items that would indicate tampering, Feldhausen said.

Officials said that most rollbacks are made in late-model luxury cars that have been leased, driven hard and turned back to the leasing agency for resale. Other prime targets are cars that have been rebuilt following serious accidents, flood damages and the like, according to officials.

The practice of rolling back odometers to reflect lower than accurate mileage may cost used-car buyers nationwide an estimated $2 billion annually in inflated prices, according to the National Traffic Safety Council.

DEC Manual Explains Maintenance

MERRIMACK, N.H. — Digital Equipment Corp. has published a free 110-page handbook on maintaining its computer systems and associated equipment.

The "Self-Maintenance Handbook" covers service planning, site preparation and installation, remedial and preventive maintenance and product upgrades. It was written for those who find self-maintenance a more effective solution than conventional service contracts, according to a DEC spokeswoman.

The handbook is said to enable users to develop a self-maintenance program, including how to determine whether self-maintenance is the most economical approach, manpower planning, how to determine labor charges, scheduling and maintenance aids.

The handbook can be obtained free of charge from DEC's Installed Base Group at DEC, Self-Maintenance, MK01/W83, Continental Blvd., Merrimack, N.H. 03054.

New Zealand Rep Elected to PTC

HONOLULU — The Pacific Telecommunications Council (PTC) has elected a representative of the New Zealand Post Office to its board of trustees.

Elected to the board was Donald R. Murphy, deputy director-general for the New Zealand Post Office. He will serve as vice-president for external relations on the board. Murphy fills the unexpired term of George L. Lissandrello, who recently resigned.

More information about the council is available from PTC, Suite 303, 1110 University Ave., Honolulu, Hawaii, 96826.

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Relocation Firm Picks Up Revenues With Net

CHICAGO — You might say that Equitable Relocation Management Corp. (ERMC) is in the moving business, except that the firm, based here, does a lot more than transport people and things from here to there. On behalf of hundreds of corporate clients, it also finds homes, purchases employee residences and even provides spouse counseling to aid in the search for employment in a new city.

ERMC has branches in 11 cities and handles about 15,000 employee transfers each year. To facilitate these transfers, in 1980 the firm installed a nationwide distributed processing network with an on-line, central data base in its Chicago facility. The data base and other software are based on two Digital Equipment Corp. VAX-11/780 superminicomputers — a $4 million investment that has paid for itself in just three years, according to Steven Ouzounian, ERMC's director of information services.

"We have an almost airline reservations-like system in which transferees and clients can call and receive current status regarding the relocation," Ouzounian said. "Using terminals, we can tell them exactly how the home sale, move and home finding is going."

Before the Net

"Before the network, we used a large mainframe with remote data entry stations," he continued. "Relocation information was entered daily and batch processed with the printed data returned, in some cases, a week later. With that system, we never had current information, which is vital, especially in the volatile real estate market. In early 1980, we decided to establish an on-line system that would allow interactive access to all data."

For a nine-month period, an ERMC project team examined the firm's operation, streamlined forms requirements and prepared system flow charts. They also retained Peat, Marwick, Mitchell & Co. to assist in writing the requirement definition and establishing conceptual design.

Of the eight manufacturers supplying proposals, the field was narrowed down to DEC, Hewlett-Packard Co., Prime Computer, Inc. and Wang Laboratories, Inc., based primarily on evaluation of data base management, communications and office automation packages. "System expandability also was a key element, as we anticipated increased business volume," Ouzounian recalled. "Following a trip to each manufacturer and a review of system and software, we selected DEC," he said.

Central System

Located here, the central system incorporates a pair of DEC VAX-11/780 superminicomputers, each with 8M bytes of main memory, sharing eight dual-ported RP07 disk drives with 4.128G bytes total storage. A VAX-11/750, also located here, provides 4M bytes of main memory and 512M bytes of storage.

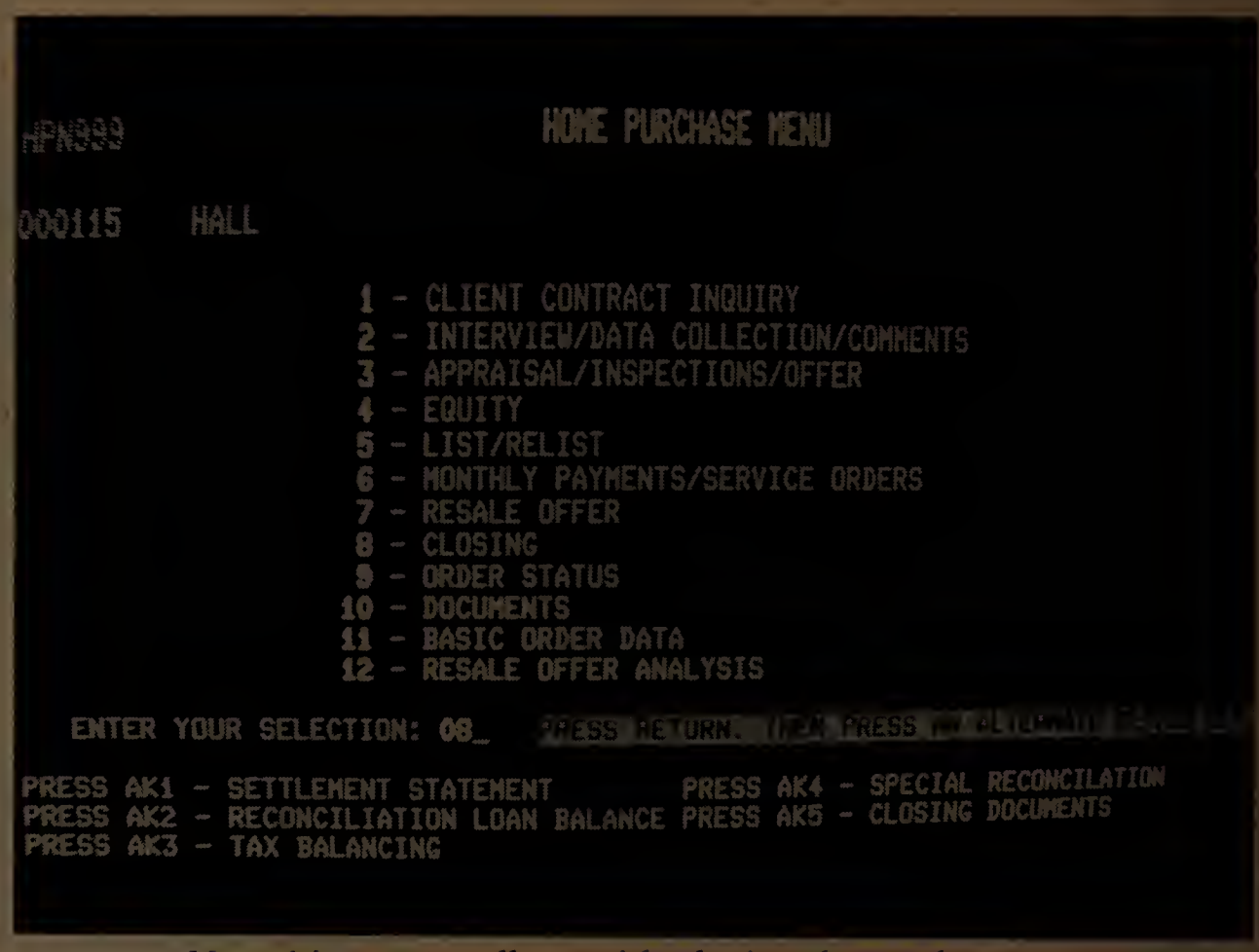
The network consists of 11 nodes using DEC's Decnet protocol, connected in a four-loop, ring configuration via 9,600 bit/sec leased lines. If any link fails, communications continues through the remaining lines. The nodes are located in 11 cities.

At each location is a VAX-11/750 with at least 2M bytes of main memory and a 128M-byte RM80 drive. In addition, there are about 300 DEC VT102 CRTs throughout the system, including 30 used by the DP staff for program development. Hard copy is provided by 100 DEC LA100 printers throughout the facilities and 300 line/min printers for reports at the nodes.

Software includes DEC's VAX/VMS (Version 3.1) operating system, VAX-11 data base management system, Cobol, Decnet, DEC's Datatrieve, DEC's FMS Forms Management and DEC's All-In-One, a VAX-based package for word processing, electronic mail and calendar management. The applications software was written as a joint effort by ERMC and Peat, Marwick, Mitchell. Total system costs, including hardware, were $4 million.

The VAX-11/780s maintain complete financial records for ERMC, along with the status of each client company account. Costs and charges associated with each transferee are posted daily, sorted and compiled to that individual's and his company's account number.

With the new VAX-based system, ERMC plans to increase business and corresponding revenues about 30%, without a corresponding increase in staff. "Our analysis shows a system-cost payback within a three-year period," Ouzounian said, "based on continued productivity and order-volume improvements."



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Allows End Users to Program Reports

Report Writer Offers Oil Firm Quick Data Access

FORT WORTH, Texas — In the fast-paced, highly volatile business of oil production and distribution, access to up-to-date information can mean the difference between success and failure.

To support its need for quick and easy access to data base information, Champlin Petroleum Co. turned to an on-line report writer.

The report writer — Answer/DB from Informatics General Corp. — has interactive syntax checking and editing capabilities. It runs on Champlin's IBM 3033 mainframe and is used to produce most of the ad hoc reports for Champlin's on-line production reporting system.

It also helps the firm's executives to use all the information it collects in the process of exploring, producing, refining and marketing its petroleum and gas products.

User Creates Reports

According to Kort Peters, manager of data base administration, reports that previously had been part of a data processing backlog are now being created by the end user.

"After only a few hours of self-instruction, the end users can program an ad hoc report. Typically, in an hour or so with Answer/DB, a report can be created that would have taken a day or two to program in Cobol and required a programmer," Peters asserted.

The advantage of Answer/DB in the Champlin environment, Peters claimed, is that users can tailor their reports to provide exactly the information they want.

"Each user can quickly modify the report to present the information in new ways or answer a different question. As a result, the user often gets answers to questions he had not anticipated," he said.

Champlin's oil and gas production activities are monitored using an integrated on-line system of reporting.

Managers and others using this system are located in a network of regional offices stretching across the U.S. and Canada.

Before the on-line system was installed, the reports, which compile information on the activities of producing oil and gas properties, were prepared manually by clerks at each regional office and submitted to company headquarters for processing into a specific format through keypunching into a card-based computer system.

Such a system, with its lack of flexibility, did not enhance productivity. "We needed a system that could accommodate the need for each office to see its data differently, and we wanted to avoid taking a lot of design time trying to anticipate the different needs of respective offices," explained Don Erwin, manager of production management systems.

"This required that we provide end users with the facility to create their own reports," according to Erwin.

Since the company was already using the Informatics Mark IV Implementation System for batch applications in its non-data-base environments, the company was looking for a system that would provide Mark IV-type capabilities, but which could be operated by non-DP end users.

Furthermore, such a system should not require knowledge of Job Control Language or IMS structural language, so that programmers could be freed from the tasks of writing simple reports. To fulfill these requirements, Champlin chose Answer/DB.

For installation at the company, modifications were made to the package to allow it to tie in with the company's IMS menu processing system and to accommodate other special report distribution and data security requirements.



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Exec: Telecommuting Strengthens Manager's

By Marguerite Zientara
CW Staff

MONMOUTH JUNCTION, N.J. — With the increased interest in flexible work schedules in the DP shop [CW, June 20], some firms are turning to telecommuting as a way to save space, decrease turnover and attract a larger portion of the labor pool.

For those contemplating such a move, the challenge of setting up a telecommuting program in DP is not technical but managerial, according to Gil Gordon, president of Gil Gordon Associatesok here, a telecommuting consulting firm.

And once in place, such a program often strengthens a manager's skills by forcing him to manage more actively, Gordon pointed out. "It's an uncanny thing — when you talk to managers of telecommuters, they say it makes them better managers in the office. It serves as a reminder to them of things they may have done intuitively, but with telecommuting must pay more attention to."

Must Set Goals

Telecommuting management forces a manager to set goals, do project reviews and be available for coaching and counseling. "Many traditional managers have the luxury of not doing those things because they have frequent contact with their subordinates, and they practice 'hallway management,'" he noted.

Management at a distance is not a new idea, Gordon observed, since sales representatives, delivery people and meter readers have been managed remotely for some time. "As with sales reps, for example, the manager has the responsibility of recording and highlighting the performance of home workers so the rest of the company doesn't forget about them," he said.

What jobs in the DP department are most suited for telecommuters? "Jobs with a higher degree of predictability, jobs that allow measurement of beginning and end points and jobs in which the need for interaction with people is predictable are most suitable."

For example, a systems analyst can predict at what point in a project he will have to deal with the user, while a sales manager or factory maintenance manager must deal with unpredictable crises requiring immediate action.

Besides systems analysis — data entry, programming, word processing, training program design and systems engineering jobs are ideal for telecommuting, Gordon believes. "At the heart of many failed telecommuting attempts so far are attempts to integrate jobs that don't fit," he noted.

In addition, telecommuting "doesn't have to be permanent or full time. Telecommuters don't have to stay out of the office every day; they can come in once or a few times a week, or just at the point in their project where it's appropriate," he added.

However, Gordon emphasized that ongoing contact with the office is of key importance. Contact can be maintained in a number of ways, he suggested. Routing lists and memos can be sent

System Users To Confer Sept. 18-21

PHILADELPHIA — System applications will be the focus of the Fifth Annual National Users' Conference for Personnel Data Systems, Inc.'s resource management systems here Sept. 18-21.

Sponsored by the vendor, the four-day meeting will feature discussion by system users, focusing on utilization of the human resource management software in various hardware and operating environments. Personnel Data System's products include the Pass personnel system and Accu-Pay payroll system software.

Registration for the conference costs $350. More information is available from Personnel Data Systems at 15 E. Ridge Pike, Conshohocken, Pa. 19428.

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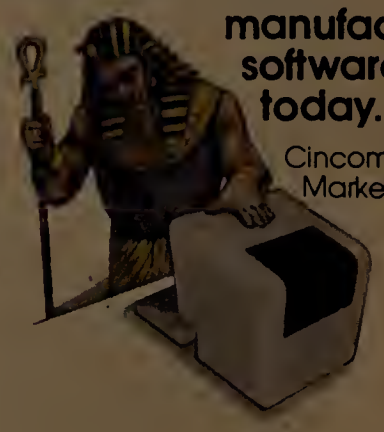
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via electronic or voice mail; telecommuters can come in for regular departmental meetings; and a "monitor" can be appointed to apprise telecommuters of social events at the office or after work.

Contact Important

Such contact is important not only for the mental health of the remote workers, but also as a way of maintaining their loyalty to the firm. "People working at home all day every day tend to 'go native' and forget whom they're working for," Gordon said.

How does management select the people best suited to telecommuting? "You should select people who know their jobs and whose quality of work is good enough so that you can trust them when they're away from the office," Gordon suggested.

While telecommuting is good for someone who does not need or want hour-by-hour contact with the boss, it is not for the marginal or the learning employee, he added. Telecommuting also may not be good for people with high social needs "who thrive in the midst of a crowd."

And very ambitious people who are intent on climbing the corporate ladder may be uneasy working at home, where they enjoy less corporate visibility, he added. In any event, a worker should not rush into it, but rather do it on some sort of trial basis.

Telecommuting Suggested For Fast-Growing Firms

MONMOUTH JUNCTION, N.J. — What types of companies should — or should not — contemplate a telecommuting program?

"Companies that are growing very fast and bursting at the seams can consider it as a space-saving measure," recommended Gil Gordon of Gil Gordon Associates here. "A company can ask itself, 'Can we consciously decide to underbuild to only 90% to 95% of our needs and fill the rest with telecommuters to save building, heat and service costs?' "

In a metropolitan area, a company that owns its own building could consider vacating a floor of in-house workers and leasing it out to outside tenants. "They may find they'll earn more through a leasing arrangement," Gordon suggested.

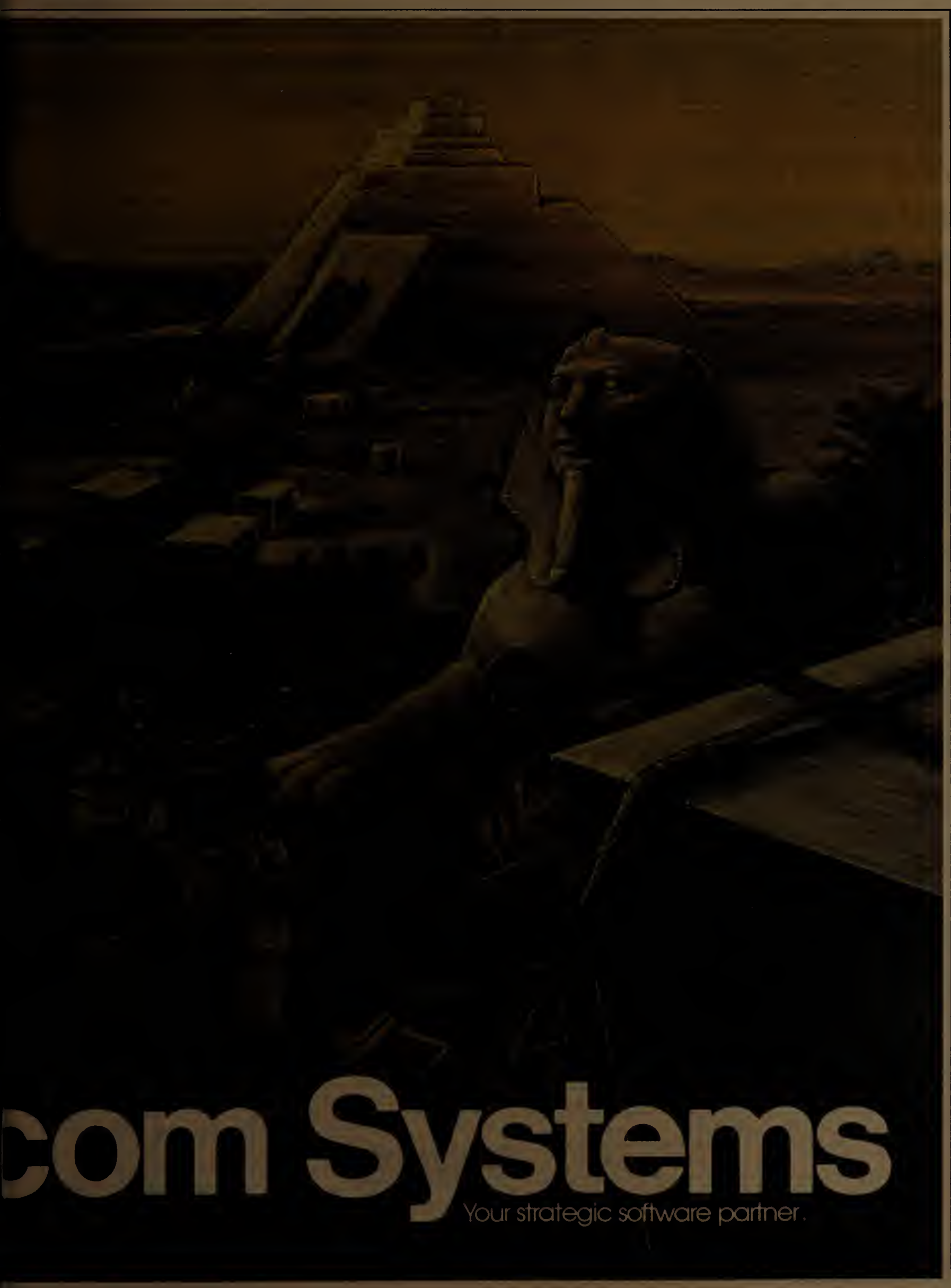
Easing Work Load

In addition, DP departments with computer capacity problems can look to telecommuting to ease the work load on their machinery. "Most on-line computer systems are designed for the first shift, which carries 90% of the work load," Gordon pointed out. Moving some of the work load to the third shift can increase response time, thus improving productivity, and leave more resources available during the day's peak hours.

Also well suited are businesses with a high percentage of information-oriented jobs, such as banking or insurance. However, a company with data security concerns, such as a medical facility, probably would not be appropriate for such a program.

Gordon pointed out that "telecommuting is not a substitute for infant care — that's one of the great myths. Life with an infant is not a predictable existence." However, "in the later months of pregnancy or when the children get older, it's fine."

Companies also should not use telecommuting "as a way to scale back pay and benefits or to bust up a union organizing drive," Gordon stressed, calling it one of the potentially "horrendous abuses" of telecommuting. "Those who would try that are the same managers who would take advantage of word processing equipment's capabilities to count keystrokes and turn the office into a sweatshop."



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Justice Department Airs Views On Proposed Hikes in Ecom Rates

By Phil Hirsch
CW Washington Bureau

WASHINGTON, D.C. — To pay its own way, Electronic Computer-Originated Mail (Ecom) — the controversial electronic mail service offered by the U.S. Postal Service — must earn enough to repay its development costs with interest, the Department of Justice said late last month.

The department's views, contained in a statement submitted to the U.S. Postal Rate Commission, represent the latest development in a continuing battle between the Postal Service and commercial providers of electronic mail services.

The basic issue at the moment is whether a proposed increase in Ecom rates is adequate. The Postal Rate Commission has to consider this question and issue a recommended decision to the Postal Service's Board of Governors before any increase can be implemented.

Postal Service administrators want the governors to authorize a rate of 31 cents for a one-page Ecom message and 40 cents for two pages. The current rates are 26 and 31 cents, respectively.

In addition, the administrators have asked for elimination of the present 200 message/transmission minimum and for permission to offer a reply envelope, costing 4 cents, as part of Ecom service.

Early last month, the Postal Rate Commission's presiding officer, Janet D. Steiger, asked interested parties to comment on the issues that the commission should consider before writing its recommended decision. The Justice Department filing, which covered essentially the same ground that commercial vendors traversed in their statements, said a major issue is whether it will be possible to detect and prevent subsidization of Ecom by Postal Service monopoly services.

The Justice Department added that the Postal Rate Commission is legally required to consider the impact of Ecom, at the proposed rate levels, on commercial electronic mail services, which generally charge substantially more.

The Postal Service, in its comments, said that "the only matters properly at issue in this proceeding" are whether the proposed rates, elimination of the 200 message minimum and the offering of a 4 cent reply envelope are legal under the Postal Reorganization Act.

The next major development is scheduled for Aug. 17, when postal officials who have submitted written justifications for the proposed changes will be subjected to oral cross-examination.

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For less than $1600, you can plug in Tek's compact 4695 Color Graphics Copier. The 4695 uses a palette of 125 shades to produce report-size paper or film copies of on-screen displays at the push of a button.

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Grocer Service Organization To Add General Ledger Tools To Aid Members' Flexibility

SEATTLE — Associated Grocers, Inc. (AG), an organization here that services some 329 independently owned grocery stores in the Northwest, will soon provide more than two-thirds of its membership with financial reporting and management software to increase their information processing flexibility.

The customized general ledger packages are from McCormack & Dodge, Inc. of Natick, Mass.

AG purchased McCormack & Dodge's G/L Plus general ledger package in 1981 not only to increase flexibility, but also to provide financial reporting flexibility in the accounting services that AG provides its individual stores, according to Warren Sexton, AG's internal auditor.

New Capabilities

The new package will allow its customers to generate financial reports on general ledger accounting activities, budgeting and profit planning, cost accounting, financial statement presentation and asset management.

"We have never had that capability before," Sexton commented. "For most types of reports, our customers have either worked out the figures manually on a scratch pad or used their gut feeling."

The AG DP department, which operates an IBM 3033 mainframe, is in the process of developing a network through which the independent store owners will be able to interact.

The stores will be using terminals, printers or their own computer systems that range from IBM Series/1 systems to Prime Computer Corp. minicomputers.

Sexton expects the transition from the 10-year-old general ledger system to G/L Plus to go smoothly for AG customers, as the company has already spent 1½ years planning the procedure and changing its own accounting to G/L Plus.

According to Sexton, G/L Plus was chosen over other general ledger packages primarily because of the product's capabilities and flexibility. "With so many capabilities, it was very easy to expound the virtues of the system and draw both AG personnel and our customers into our enthusiasm," Sexton said.

Separate Timetables

The timetable for the switch to G/L Plus depends largely on each store's fiscal year. Before year's end, AG accountants will work with each grocery's management to determine individual reporting needs.

After the accountant sets up the individualized reporting system, a process estimated to take 30 days, the store's management will spend about five days for training on the use of G/L Plus, Sexton said.

Sexton anticipates little apprehension on the part of the store owners in acquainting themselves with the system.

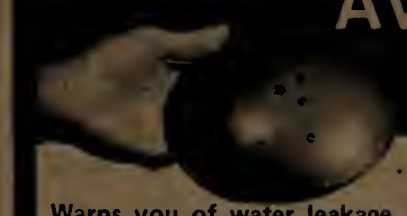
"We are providing several seminars to introduce them to the systems, and we will provide all the assistance necessary to ensure an orderly and error-free implementation," Sexton said.

For the most part, Sexton said, frustration has centered around the new role each accountant has had to assume. Prior to G/L Plus, all reports were formatted and hard-coded by AG's DP department into the general ledger programs. Now each accountant must learn how to set up a report and code the extracted information, Sexton said.

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THE SOFTWARE ENGINEERS

Financial Journal Switches to In-House System

NEW YORK — After 18 years of running batch programs on time-shared computers, a weekly financial newspaper here has decided to install an in-house computer system to analyze stocks.

Value Line, Inc., which produces the Value Line Investment Survey for some 115,000 subscribers uses computers as well as input from its own staff of analysts to produce short-term analyses of 1,700 common stocks.

The firm is currently in the process of installing Tandem Computers, Inc. Nonstop II computers running under Tandem's Guardian operating system to replace an IBM 4341 and a Burroughs 6930 located at two time-sharing services.

Also underway is a massive batch-to-on-line software conversion project, which is three-quarters of the way towards its completion, according to Harold Levine, director of data processing at Value Line. Parts of the new and old systems will be running in parallel mode until the conversion's completion, estimated at sometime before January. The process has been hampered somewhat by the fact the newspaper goes to press weekly, Levine said.

The financial journal's use of a computer to analyze and prepare a price/performance ranking of common stocks over a six- to 12-month period goes back to the mid-1930s. The ranks are determined by a computer program that weighs information on stock prices and earnings. Prior to computerization, the firm was doing a lot of regression analysis using electronic calculator machinery.

"It was deadly," said Value Line's head statistician, Samuel Eisenstadt. Mass producing the regression analysis via computers "not only speeded up the process, but it opened the way to new ideas and approaches," Eisenstadt said.

The key to these computer reports is that they are factually based, involving no human judgment, other than the inital input of data, Eisenstadt said. Since analysts do not always agree with the computer's result, an experiment was devised to test the outcome of the addition of human judgments into the computerized analysis.

"After an exhaustive study, it was determined that [human judgments] neither made a contribution nor hurt what did happen, but that in the process was harmful by creating 'noise' — a shifting in the ranking that provided no benefits," Eisenstadt said.

One benefit of the computerized analysis is that it takes the burden of predicting near-term results of up to a year "off the analyst's back," he added. Among other things, analysts are able to focus instead on three- to five-year forecasts that require a combination of a statistically derived model and the input of the analyst's judgment, according to Eisenstadt. Automation also afforded the firm the opportunity to examine more stocks, which led to the hiring of more analysts to make forecasts, Eisenstadt added.

Neither Eisenstadt nor Levine is aware of any other similar service that uses computer analysis of stocks. One reason may be the prohibitive cost of starting up such a system, which requires a substantial data base extending back through a significant period of time, Eisenstadt said.

Also planned for the future is a "terminal on every analyst's desk" to provide forecasters with better access to the computer's data base, Levine said.

The firm has already installed a number of Tandem T16-6530 terminals, he added.

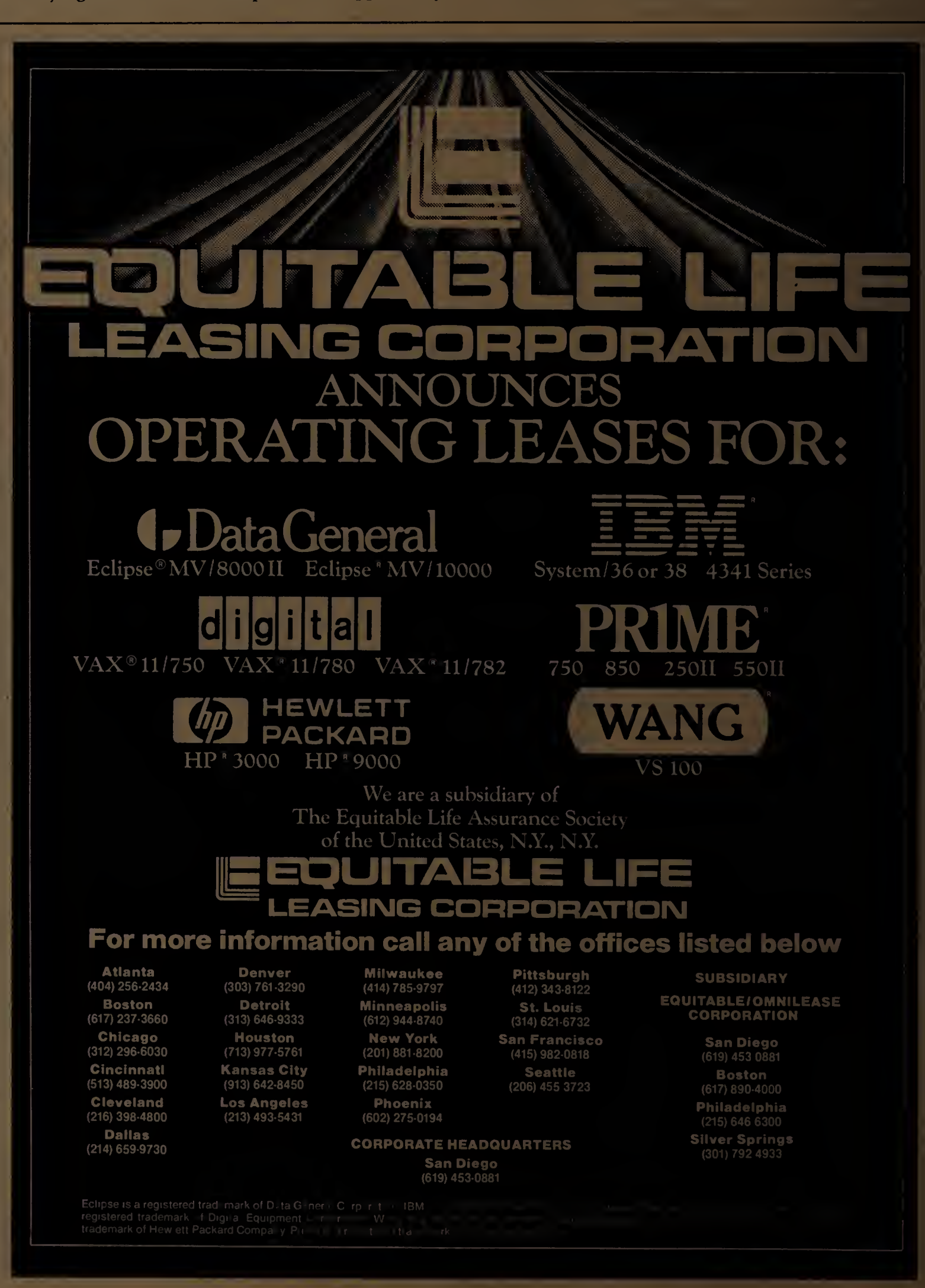
Bank Officials Land Ansi Posts

WASHINGTON, D.C. — Donald R. Monks, senior vice-president and manager of the Deposit Services Division of Irving Trust Co., New York, was recently approved as vice-chairman of the American National Standards Institute's Committee X9 — Financial Services, the American Bankers Association (ABA) announced.

Blake Greenlee, vice-president of the International Technology Group at Citibank, was appointed chairman of the X9F subcommittee, which serves as the International Advisory Group of the X9 Committee. Greenlee and Monks were ratified for their positions by members of the X9 Committee, which develops standards for financial services operations.

The X9 Committee oversees and approves the work of several subcommittees and working groups, has published nine standards for the industry and has eight ongoing projects. Thirty-one organizations, including banks, manufacturers, vendors and regulators, comprise the X9 Committee membership. More than 200 organizations are involved in the work of the committee and its subcommittees. The ABA serves as the X9 secretariat.

As part of its responsibility, the X9F subcommittee coordinates, presents, defends and votes the U.S. position to the International Standards Organization Technical Committee No. 68 on Banking, which has 18 member countries.



With Multiuser Operating System

Atari Resolves Programmer/System Dilemma

SUNNYVALE, Calif — What do you do when your programmers are married to one operating system, but your requirements dictate the use of another? That was the dilemma facing Atari, Inc., a marketer of home video games and software.

The firm uses minicomputers to develop games for its microcomputer-based products.

However, with the company outgrowing its crop of Digital Equipment Corp. single-user systems, Atari was in need of a multiuser operating system, while still retaining its familiar RT-11 operating system environment.

As a compromise, the company chose a PDP-11-compatible operating system called TSX-Plus from S&H Computer Systems, Inc., based in Nashville, Tenn., to develop software for two video game systems — the 2600 Video Computer System and the newer 5200 Supersystem.

Sharing Resources

According to Mark Davis, manager of software support engineering, by implementing TSX-Plus on more than 20 DEC computers, ranging from LSI-11s to PDP-11/34s, Atari has been able to share costly resources among 45 users, while remaining compatible with existing RT-11 and TSX software and languages, including Basic, Cobol and Pascal.

"TSX-Plus has provided comparable performance to other PDP-11 multiuser operating systems, and it has given us continuity by retaining RT-11's features," Davis commented. TSX-Plus features, he said, include a straightforward directory structure, on-line Help and a familiar core of four or five commands that do most of the work.

"The nice thing about both RT-11 and TSX is that programmers don't have to be completely versed in the operating system to use them," Davis added.

According to Atari, TSX-Plus is a self-contained operating system that entirely replaces the RT-11 kernel. Using the DEC system's memory management facilities, it allows each time-sharing job to access up to 56K bytes of memory with multitasking capability.

It also reportedly supports 22-bit addressing, thereby allowing up to 4M bytes of main memory on PDP-11s.

A real-time support facility allows multiple real-time programs to be run concurrently with normal time-sharing operations, Davis explained.

"The operating system allows us to support up to 20 users on a single machine, providing the standard RT-11 functions plus several useful enhancements," he added. According to the software support manager, TSX-Plus is configurable during the system generation process, so that engineers can select or remove almost any of the features in order to optimize performance.

"In fact, the most recent versions have allowed us to fine tune the system on-line without having to do a new system generation.

"Furthermore, we have been able to run all of our RT-11-compatible software without modification," Davis reported.

Third-Party Acceptance

The acceptance of TSX-Plus by the third-party software community has, according to Davis, resulted in a number of packages that work well in a multiuser environment. "We have enhanced the utility of our installation with several of them, including a cross-assembler, a full-screen editor and a network system," he explained.

To ensure security in a multiuser environment, Atari implemented a system called the Sub-Device system from Omnex Corp. Davis claimed this system provides an enhancement to the basic TSX security controls by permitting the assignment of virtual devices.

"Restricting a designer from an entire physical disk would be problematic since we only have a couple of drives per computer," he explained.

"Instead, this system allows us to establish a file that appears to the system as a device, thereby allowing us to control access very precisely."

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Slashing Program Analysis Time

Tool Eases Firm's CICS Testing, Debugging

NEWPORT BEACH, Calif. — Application programmers at Avco Financial Services (AFS) took their traditional procedures for testing and debugging CICS programs and threw them out the window six years ago.

Since then, they say, they've cut the time needed for program analysis from days to minutes, improved their program debugging efficiency tenfold and gained the confidence that their new CICS programs won't abend the production system.

"All we needed to accomplish this efficiency was the proper tool," said Dominic Chen, manager of the Information Systems Division at AFS, a Newport Beach, Calif.-based subsidiary of Avco Corp. The tool is called Intertest, from On-Line Software International of Fort Lee, N.J.

Intertest monitors all new or acquired CICS programs, which the Information Systems Division offers the three groups comprising AFS: Avco Financial Services, offering consumer and commercial extensions of credit, bank and thrift services and response marketing; Avco Financial Insurance Group, an international company offering credit, life and specialty casualty insurance; and the Paul Revere Co., an insurance firm located in Massachusetts.

Intertest, which runs on the company's IBM 3033 and 3083, was installed to aid application programmers in essentially three areas: program analysis, debugging and quality assurance, Chen said.

Chen explained how Intertest was once involved in sharply reducing the time needed to analyze a casualty insurance system purchased from an independent vendor. "The system was written in Cobol macro and had many on-line components," he said. "When we decided to make modifications to certain transactions, we ran into some trouble. The vendor provided documentation and program source listing, but since we were unfamiliar with the program, we needed help in determining how the transactions were designed.

"We used Intertest to preset breakpoint conditions so we could evaluate the program as it passed through each area — a procedure which allowed us to establish the transaction flow in minutes. Without Intertest, that analysis would have taken several days."

Productivity has also improved during program testing and debugging, Chen added, because they can be done without a software aid. "Once the program abends, the programmer searches through the core dump to find the coding error. The error is corrected, and then the programmer recompiles the program and reruns the test program — maybe going a little further without an error. This is a time-consuming, static task, because only one program can be traced at a time. It may take a full day just to fix one problem."

Unlimited Breakpoints

With Intertest, AFS application programmers set an unlimited number of transaction-level breakpoints throughout the program. As the test program proceeds through each transaction, Intertest notes such exceptions as nonnumerical data appearing in numerical fields. These error notations are stored for evaluation at the breakpoint. If a problem occurs, the programmer can use an Intertest command to change the data or machine instructions on-line and reset the program to run up to the next breakpoint.

"A programmer can run through five to 10 breakpoint conditions before having to recompile the program," Chen said.

The quality assurance benefits of Intertest also are very important in this environment, Chen said, because AFS employs numerous junior programmers with little CICS experience. To eliminate major programming errors that may abend the test system, a senior programmer is assigned to review their work. Before Intertest, that review was a manual process. Today, the senior programmer uses the testing aid to set breakpoints throughout the program and review it on-line.

One of the most frequent errors the junior programmers make is releasing the temporary working storage of another program — an error which causes CICS abends in the production environment. Without Intertest, the senior programmer can only find this error by reading a core dump. With Intertest, a message appears on-line, and the senior programmer can correct the situation before it occurs in the production environment, Chen said.



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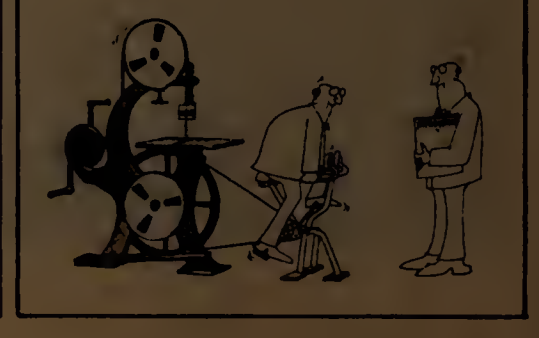
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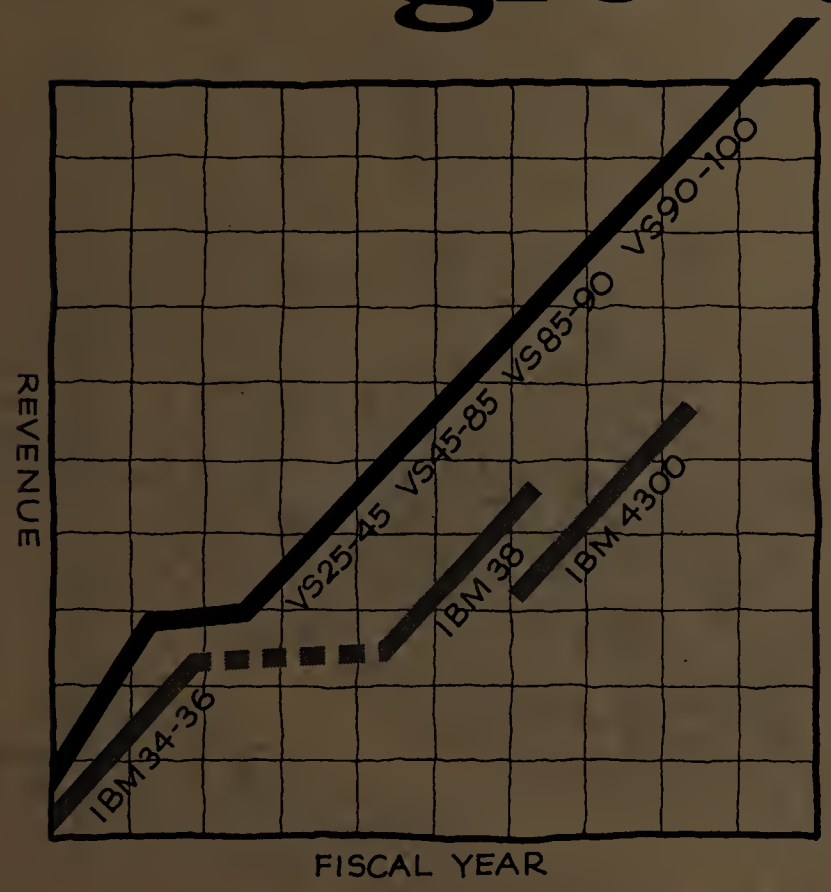
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Minicomputer Helps Plant Retailer Monitor Development of Flowers

LITCHFIELD, Conn. — A rose is a rose is a rose, but can it survive the rigors of direct mail?

Probably, especially if a firm uses a minicomputer to monitor every stage of plant development from propagation to harvesting. Such is the case at The White Flower Farm based here, a leading direct mail retailer of perennial plants.

There is a big difference between the type of hard goods usually sold by direct mail retailers and the living plants offered by The White Flower Farm. Proprietor Elliot Wadsworth points out that even the hardiest perennials cannot be stored on warehouse shelves for long periods of time, nor can they be mailed whenever the order is received. Plants must be propagated, cultivated, nurtured and harvested within tightly prescribed seasonal limitations to guarantee plant quality and successful growing in the widely varying climate zones found in various parts of the U.S., he said.

Tight Controls

All of this is tightly controlled by the farm's horticultural staff. They use an IBM System/34 minicomputer to help monitor the stages of plant development. "Visiting" every plant daily, the staff notes their condition and monitors the environmental conditions in the fields and greenhouses. They take whatever corrective action is indicated. Everything is reported to the computer room, via walkie-talkies, directly from the fields.

As they are received, the reports are entered into the system's memory by an operator. Thus, the computer constantly tracks the care and feeding of each of the thousands of plants being nurtured on any given day.

Staffers can consult the data base directly via a display screen terminal in the computer room for an immediate update on a specific matter, or they can consult a once-a-week printout that contains all pertinent management information regarding horticultural operations. The farm utilizes six IBM Model 5251 terminals located in their computer room, bookkeeping and customer service departments and inventory control office. The printer is an IBM Model 5211.

Order processing is also more complex than for hardgoods-oriented direct mail operations. Plants are not taken out of the fields, greenhouses or refrigerators until a day or two before shipment. At that time, they are cleaned and packaged for immediate shipment by the fastest available means.

To assure timeliness, the computer is used to schedule and prompt harvesting, to track counts and locations in a climate-controlled warehouse and to monitor seasonally adjusted shipping dates, which vary for every plant and every region of the country. "It's hard to remember how we did it before we bought the System/34," Wadsworth, who is also editor and publisher of *Horticulture* magazine, said.

The system is also used to process list maintenance and financial control functions at The White Flower Farm.



Leslie Nelmes (right), vice-president/operations, and Karen Delaghelfa, operator, preside over the farm's DP room.

Deltak Training Series Out For IMS/VS Lead Operators

NAPERVILLE, Ill. — A training series designed for lead operators of IBM's IMS/VS operating system was announced by Deltak, Inc.

Compatible with the IBM Interactive Instruction System and Goal Systems International, Inc.'s Phoenix presentation system, the new Deltak four-course series, No. 32-7XX-CE, "IMS/VS Master Terminal Operations," assumes the user has two or three years of experience as a lead operator and is familiar with IBM's ACF/Vtam.

Courses are available for rental fees averaging from $50 to $125 per course. They can be purchased for $1,750 each from Deltak, East/West Technological Center, 1751 W. Diehl Road, Naperville, Ill. 60566.

AT&T Information Systems Details Institute's Courses

PINE MOUNTAIN, Ga. — AT&T Information Systems, Inc., formerly American Bell, Inc. has released course details of its Communications Management Institute.

"Office Information Management Resources (OIMR): Where Did the Future Go?" is scheduled for Aug. 22-25, Sept. 12-15 and Oct. 10-13. "Information Distribution Management (IDM): Networking for the '80s" is scheduled for Aug. 29-Sept. 1, Sept. 19-22 and Oct. 17-20.

The OIMR course costs $800; the IDM course costs $920 from AT&T Information Systems, Registrar-CMI, P.O. Box 8, Pine Mountain, Ga. 31822.

Library Announced By TPG

NEW YORK — A Quality Assurance Library providing standards and support products for data processing quality assurance programs has been announced by The Productivity Group, Inc. (TPG).

Volumes currently available include: User/Data Processing Service Agreement; Cobol, Assembler and Focus Programming Language Standards; Production Service Level Reporting Guidelines; and Post Implementation Review Guidelines.

Also included are: Capacity Planning Guidelines; Testing and Implementation Standards; Telecommunications Standards; Systems Design and Documentation Standards; Quality Assurance Forms Library; Estimating Guidelines; and Terminal Dialogue Guidelines. Prices range from $20. More information is available from The Productivity Group, Inc., Suite 32 S., 305 W. 98th St., New York, N.Y. 10025.

Directory On Satellites Introduced

McLEAN, Va. — Telestrategies Publishing, Inc. is offering the "1983 Satellite Transponder Supply/Demand Analysis and Availability Directory."

The 150-page directory offers a classified section designed to pair available satellite space with business users in search of full- or part-time transponder space. Transponder owners and users can list their equipment available for rent or lease, the time of availability and the terms of usage, the vendor said.

In addition, transponder users and owners can also list their other satellite services, such as uplink and earth-station facilities, the firm said.

The directory costs $595 and will be updated quarterly. Telestrategies is located at 6842 Elm St., Box 847, McLean, Va. 22101.



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Afips OA Conference Set For Feb. 20-22 in Los Angeles

LOS ANGELES — The American Federation of Information Processing Societies, Inc. (Afips) has scheduled its 1984 Office Automation Conference, "Office Automation and You," for Feb. 20-22 at the Los Angeles Convention Center here.

The fifth annual conference will feature a complete conference program organized in five tracks oriented toward the interests of particular attendees: managers and administrators, technology managers and planners, analysts, consultants and implementors, product designers and developers and end users, Afips said.

In addition to the conference program, Afips is planning a series of half-day and full-day Professional Development Seminars. These seminars will address a variety of topics in the office automation field.

An executive program has been added. This program will consist of a half-day symposium on management issues in the office automation field.

The full conference and exposition costs $100 if paid by Jan. 13, 1984 and $125 thereafter. A single-day exhibition floor and session admission is $40, and admission to the exhibits costs $30.

More information about the conference is available from Afips at 1815 N. Lynn St., Arlington, Va. 22209.

Federal OA Conference Slated Nov. 1-3 in Washington, D.C.

WASHINGTON, D.C. — The National Council for Education on Information Strategies will sponsor the Federal Office Automation Conference Nov. 1-3 at the Washington Convention Center here.

The conference will feature a practicum of how-to-do-it workshops, briefings on technology and sessions that examine office automation problems and solutions, the organization said.

More than 100 representatives of major government agencies and consulting groups are scheduled to appear as speakers. In addition, tutorial sessions, designed by industry and government advisory groups, are scheduled to help educate federal administrators, the organization said.

The full conference costs $250 for federal employees and $350 for non-federal employees. More information is available from the National Council for Education on Information Strategies, which can be reached through P.O. Box N, Wayland, Mass. 01778.

Ansi Announces Title Changes

NEW YORK — The American National Standards Institute (Ansi) has changed the title of its president, L. John Rankine, to chairman of the board. The title of Executive Vice-President Donald L. Peyton has been changed to president.

The title changes were dictated by a revision of Ansi's constitution and bylaws, which was recently accepted by the membership.

Rankine is director of standards and data security at IBM. He assumed office Jan. 1. Peyton joined Ansi as chief staff executive in 1966. He is a member of the Executive-Finance Committee of the International Organization for Standardization and is one of the founders of the Pacific Area Standards Congress.

Aspray Joins Babbage Staff

MINNEAPOLIS — William F. Aspray Jr. has joined the staff of the Charles Babbage Institute as associate director.

Aspray received his master's degree in mathematics from Wesleyan University and his Ph.D. in the history of science from the University of Wisconsin at Madison. His doctoral dissertation on the origins of computer science in mathematical logic has been expanded into a book to be published by Greenwood Press.

The emphasis of Aspray's current research is on the historical development of theoretical computer science, the institutional and organizational development of the computer and the history of mathematical logic in the 19th and 20th centuries.

The Babbage Institute is devoted to encouraging the study of the history of information processing. It is located at 104 Walter Library, 117 Pleasant St. S.E., Minneapolis, Minn. 55455.



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WP System Ties to Hospital's Central Data Base

FREMONT, Calif. — Managing a hospital these days requires administrators to pay as much attention to the balance sheet as their doctors and nurses do with patient care.

Washington Hospital here already had computerized systems to handle patient admissions, billing and processing of shared medical systems. What it didn't have was a modern word processing system that could tie into a central data base to eliminate any duplication.

Increasing productivity of the staff with word processing required more than merely increasing the number of pages that a secretary could type in one day, administrators decided. They wanted various departments to be able to share data resources so that individual departments would not have to create, maintain and store similar information separately.

A Honeywell, Inc. Level 6 computer installed in 1978 had proved reliable, but, according to Management Information Services Chief Robert Woods, "it didn't have much capability" in light of the new requirements that had to be met.

The hospital went back to Honeywell and was impressed with the DPS 6 system's ability to run Honeywell's Office Automation Systems software concurrently with data processing applications. In May of 1982, the hospital had installed a DPS 6/54 computer system along with three video workstations and a letter-quality, continuous form printer allowing the elimination of a time-costing step of inserting various forms in the printer for various patient records.

The hospital previously had Lexitron Corp.'s standalone word processing units, but Woods said he found that with the Honeywell systems "we could expand the capabilities of word processing not only throughout the hospital, but at a reduced price per station."

Also purchased was the Info software package from Henco Software, Inc. of Waltham, Mass., for developing small data bases for use within different areas of the hospital.

With it, an accounts payable data base was created, along with a case history data base that is having 140,000 different case records being input, and a smaller data base for personnel that includes information relating to nursing registries.

"Absolutely," Woods replied when asked if the system has performed up to expectations. Honeywell support, he said, was "very good, as much as you would expect."

Since the original installation, the hospital has added a workstation with printer in the Data Services department for use in training and as a shared station for personnel whose requirements don't justify additional stations. The hospital also has added a station in the Medical Staff department where a medical staff master file has been created.

"We recently completed an analysis of word processing needs throughout the hospital and have received a recommendation that we can use a minimum of eight additional stations," Woods said. "I can do that with a minimum of hardware; all we need do is add some memory and port capabilities."

Research Group Won't Copyright RLIN Data Base

STANFORD, Calif. — The board of governors of the Research Libraries Group, Inc. (RLG) has reaffirmed its decision not to register copyrights for the data base of the Research Libraries Information Network (RLIN).

The position "is consistent with RLG's commitment to the unrestrained exchange of bibliographic data," a spokesman said.

"Each institution is free to duplicate and distribute its own records with exactly the same freedom it has in dealing with records held locally," the spokesman said.

RLIN is a compilation of the bibliographic records of all participating libraries.

Each member of the RLG partnership reportedly offers its records for sharing on the network.

The Research Libraries Group is located at Jordan Quadrangle, Stanford, Calif. 94305.

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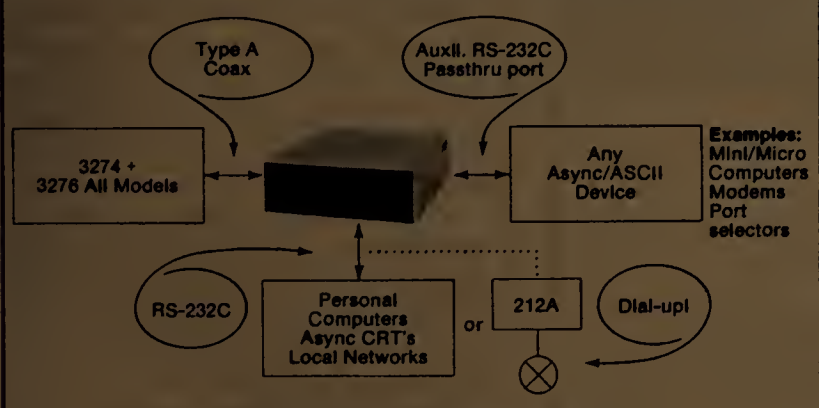
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Calendar

Week of Sept. 11

Sept. 14-16, San Diego — **The Eighth Annual Southern California Regional Users Group (Scrug).** Contact: Scrug, 574 E. Madison Ave., El Cajon, Calif. 92020.

Sept. 15, Washington, D.C. — **Computer-Assisted Manual Writing.** Contact: Promptdoc, 833 W. Colorado Ave., Colorado Springs, Colo. 80905. Also being held Sept. 15 in Washington, D.C., Sept. 27 in Chicago and Sept. 29 in Dallas.

Sept. 15-16, Clinton, Md. — **Introduction to Visicalc.** Contact: Phyllis W. Parrish, Center for Management Development, College of Business and Management, University of Maryland, College Park, Md. 20742.

Sept. 15-16, San Francisco — **Data Communication: Advanced Concepts, Products and Services.** Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

Sept. 15-16, Minneapolis — **Effective Communication Skills for Data Processing Professionals.** Contact: Registrar, Control Data Management Institute, 6003 Executive Blvd., Rockville, Md. 20852.

Sept. 15-16, San Francisco — **Ethernet-Type Local Networks.** Contact: Architecture Technology Corp., P.O. Box 24344, Minneapolis, Minn. 55424.

Sept. 15-16, San Francisco — **Integrated Information Systems.** Contact: Bob McKane, Techtran, 72 Cummings Point Road, P.O. Box 10212, Stamford, Conn. 06904.

Sept. 15-16, New York — **Successful On-Line Systems Development.** Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

Sept. 15-16, Luxembourg — **International Seminar on Microcomputers in Banking.** Contact: Societe Des Foires Internationales De Luxembourg, B.P. 110, L-2011, Luxembourg.

Sept. 15-18, Minneapolis — **The Second Annual Twin Cities Computer Show and Software Exposition.** Contact: Northeast Expositions, 822 Boylston St., Chestnut Hill, Mass. 02167.

Week of Sept. 18

Sept. 19-20, Chicago — **Computer Networks: Protocols, Standards and Compatibility.** Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

Sept. 19-20, Washington, D.C. — **How to Manage Data and Information as a Resource.** Contact: Barnett Data Systems, 19 Orchard Way N., Rockville, Md. 20854.

Sept. 19-20, Washington, D.C. — **IBM's Systems Network Architecture: A Master Plan for Teleprocessing.** Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

Sept. 19-20, San Francisco — **Multifunction Workstations.** Contact: Techtran, P.O. Box 10212, 72 Cummings Point Road, Stamford, Conn. 06904.

Sept. 19-20, New York — **Structured Maintenance: Reducing Costs with a New Methodology.** Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

Sept. 19-21, Washington, D.C. — **Successful Use of Minicomputers.** Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

Sept. 19-21, Los Angeles — **DL/1 Application Programming.** Contact: Data Base Management, Inc., 1075 Tolland Tnpk., Manchester, Conn. 06040.

Sept. 19-21, San Francisco — **Telecommunications Management: Cost Reduction Techniques.** Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

Sept. 19-21, Chicago — **Financial Planning Using Graphics and Microcomputers.** Contact: Registrar, Control Data Management Institute, 6003 Executive Blvd., Rockville, Md. 20852.

Sept. 19-21, Washington, D.C. — **Developing a Plan for Office Automation.** Contact: The George Washington University, School of Engineering and Applied Science, Washington, D.C. 20052.

Sept. 19-22, Minneapolis — **CICS/VS Logic and Debugging.** Contact: Dianne Halper, On-Line Software International, Fort Lee Executive Park, Two Executive Drive, Fort Lee, N.J. 07024.

Sept. 19-22, Portland, Ore. — **Structured Analysis and Systems Architecture Seminar/Workshop.** Contact: Jan Crosswhite, Oberland Associates, 4036 N.E. Sandy Blvd., Portland, Ore. 97212.

Sept. 19-22, New York — **IMS/DB (DL/1) Application Programming.** Contact: Dianne Halper, On-Line Software International, Fort Lee Executive Park, Two Executive Drive, Fort Lee, N.J. 07024. Also being held Sept. 26-29 in New York.

Sept. 19-23, New York — **CICS/VS Application Programming Command Level.** Contact: Dianne Halper, On-Line Software International, Fort Lee Executive Park, Two Executive Drive, Fort Lee, N.J. 07024. Also being held Sept. 19-23 in both Minneapolis and Los Angeles.

Sept. 19-23, Oakbrook, Ill.— **IMS**

(Continued on Page 41)

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Database: A Manager's Guide
Robert Holland

Boston September 26–28, 1983
Chicago October 10–12, 1983
San Francisco November 14–16, 1983

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Database: A Builder's Guide
Holland–Cole

Chicago October 31–November 3, 1983
San Francisco December 5–8, 1983

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Information Center Software Selection
Shaku Atre

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David Upham

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Calendar

(Continued from Page 40)

Systems Management. Contact: The Institute for Software Engineering, 510 Oakmead Pkwy., Sunnyvale, Calif. 94086.

Sept. 19-23, Fort Lee, N.J. — **CICS/VS Internals.** Contact: Dianne Halper, On-Line Software International, Fort Lee Executive Park, Two Executive Drive, Fort Lee, N.J. 07024.

Sept. 19-23, Phoenix — **The Sixth International Conference on Digital Satellite Communications.** Contact: Conference Administrator, c/o Communications Satellite Corp., 950 L'Enfant Plaza S.W., Washington, D.C. 20024.

Sept. 19-23, Minneapolis — **Structured Analysis and Design Workshop.** Contact: Yourdon, Inc., 1133 Ave. of the Americas, New York, N.Y. 10036. Also being held Sept. 19-23 in St. Louis, New York and Seattle.

Sept. 19-23, Boston — **Systems Design Workshop.** Contact: QED Information Systems Sciences, Inc., QED Plaza, P.O. Box 181, Wellesley, Mass. 02181.

Sept. 19-23, Long Beach, Calif. — **Structured Analysis for Real-Time Systems.** Contact: Yourdon, Inc., 1133 Ave. of the Americas, New York, N.Y. 10036.

Sept. 19-23, Dallas — **Capacity Planning and Modeling.** Contact: The Institute for Software Engineering, 510 Oakmead Pkwy., Sunnyvale, Calif. 94086.

Sept. 19-23, Anaheim, Calif. — **Information Modeling Workshop.** Contact: Yourdon, Inc., 1133 Ave. of the Americas, New York, N.Y. 10036. Also being held Sept. 19-23 in Washington, D.C.

Sept. 19-23, Philadelphia — **Systems Analysis Workshop.** Contact: QED Information Sciences, Inc., QED Plaza, P.O. Box 181, Wellesley, Mass. 02181.

Sept. 19-23, Chicago — **Structured Design and Programming.** Contact: Yourdon, Inc., 1133 Ave. of the Americas, New York, N.Y. 10036. Also being held in Anaheim, Calif.

Sept. 19-23, Chicago — **Structured Analysis/Design Workshop.** Contact: Structured Methods, Inc., 7 W. 18th St., New York, N.Y. 10011. Also being held Sept. 19-23 in San Francisco.

Sept. 19-23, Washington, D.C. — **Structured Design Workshop.** Contact: Yourdon, Inc., 1133 Ave. of the Americas, New York, N.Y. 10036. Also being held Sept. 19-23 in Anaheim, Calif.

Sept. 19-23, San Francisco — **Financial Modeling: A Structured Approach.** Contact: Yourdon, Inc., 1133 Ave. of the Americas, New York, N.Y. 10036.

Sept. 20-21, Palo Alto, Calif. — **The Factory Systems Summit Conference.** Contact: The Yankee Group, 14th Floor, 89 Broad St., Boston, Mass. 02110.

Sept. 20-22, San Juan, Puerto Rico — **The Caribbean Informatics '83 Exhibition and Conference.** Contact: Informatics '83, Suite 219, 3421 M St. N.W., Washington, D.C. 20007.

Sept. 20-22, Boston — **Project Management and Control.** Contact: QED Information Sciences, Inc., QED Plaza, P.O. Box 181, Wellesley, Mass. 02181.

Sept. 20-23, Washington, D.C. — **Structured Design and Programming.** Contact: Ruth Dordick, Integrated Computer Systems, 3304 Pico Blvd., P.O. Box 5339, Santa Monica, Calif. 90405.

Sept. 20-23, Baltimore — **Software Project Management.** Contact: Ruth Dordick, Integrated Computer Systems, 3304 Pico Blvd., P.O. Box 5339, Santa Monica, Calif. 90405.

Sept. 20-23, Anaheim, Calif. — **Data Communications: Components, Systems and Networks.** Contact: Registrar, Institute for Advanced Technology, 6003 Executive Blvd., Rockville, Md. 20852.

Sept. 20-23, San Diego — **Defining Software Requirements.** Contact: Ruth Dordick, Integrated Computer Systems, 3304 Pico Blvd., P.O. Box 5339, Santa Monica, Calif. 90405.

Sept. 20-23, San Diego — **Computer Graphics.** Contact: Ruth Dordick, Integrated Computer Systems, 3304 Pico Blvd., P.O. Box 5339, Santa Monica, Calif. 90405.

Sept. 21, Bethesda, Md. — **How to Write Better Technical Reports.** Contact: Phyllis W. Parrish, Center for Management Development, College of Business and Management, University of Maryland, College Park, Md. 20742.

Sept. 21-22, Cary, N.C. — **SAS Color Graphics Course.** Contact: SAS Institute, Inc., P.O. Box 8000, Cary, N.C. 27511.

Sept. 21-22, Washington, D.C. — **Developing Business DP Systems — A Management Briefing.** Contact: Yourdon, Inc., 1133 Ave. of the Americas, New York, N.Y. 10036.

Sept. 21-23, New York — **Computer Operations Management: Effective Techniques.** Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

Sept. 21-23, San Francisco — **Data Base Systems: Strategies for Information Resource Management.** Contact: Center for Advanced Professional Education, Suite 110, 1820 E. Garry St., Santa Ana, Calif. 92705.

Sept. 21-23, Chicago — **Computer Operations: Effective Production Scheduling and Control.** Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

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Memory Size in Bytes (Minimum-Maximum)	32K-64K	8K-64K	16K-64K	128K-2M	512K-2M	128K-2M	128K-512K
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I/O Ports	1	2	2	9	10	2	1
I/O Channel Speed (Bit/Sec)	2M Input, 1.4M Output	296K Standard Input, 344K Standard Output, 1M-2M High Speed	300K Standard, 3.7M High Speed	2M Input, 1.4M Output, 10M-20M High Speed	2.2M Input, 1.4M Output, 11M-13M High Speed	300K Standard, 4M High Speed	2M Input, 1.3M Output
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COMPUTERWORLD'S ANNUAL

HARDWARE ROUNDUP

Minicomputers

A Survey of 59 Machines From the Top 20 Mini Makers

Next Week: Microcomputers

By Tom Henkel
CW Staff

Technological advances that have made large-scale processors less expensive and microcomputers downright cheap have taken their toll on the minicomputer business.

Improved chip technologies, coupled with very large-scale integration, have given systems manufacturers the ability to sell more processing power at a reduced cost. Many microcomputers, for example, can outperform the early minicomputers and some of the older low-end mainframes. Many mid-size businesses may not be able to afford mainframes, but they can afford the 32-bit superminicomputers that offer the same performance as a small mainframe.

In spite of the business they have lost to both supermini and microcomputer manufacturers, the minicomputer manufacturers have endured. Some have survived by finding a niche that has not been filled — yet — by larger or smaller processors. Others have imbued aging processors with new life by incorporating them into specialized systems. Still others are developing smaller and larger systems to replace older minis.

The industry that gave rise to powerhouse firms like Digital Equipment Corp. and Data General Corp. now appears to be a segmented one. Most of the larger minicomputer firms have branched out and now offer a full line of processors ranging from entry-level microcomputers to mainframe-scale processors. Other vendors have chosen to migrate from the traditional 16-bit minicomputer architecture to 32-bit superminis.

Who buys minicomputers? According to a recent report by Predicasts, Inc., the minicomputer buyer is often a business whose work load is too large for traditional microcomputers but not large enough to justify a mainframe processor. The minicomputer is usually the firm's only processor, although some larger firms buy minis to augment existing computer resources.

Distributed processing applications are another key area for minicomputers. The processors can provide remote users with local computing, plus the capability to communicate with other minis at other sites or with a host processor at the main computer center.

In this week's segment of its annual Hardware Roundup, *Computerworld* has listed characteristics of systems produced by the top 20 minicomputer vendors, determined by 1982 revenues. The revenue information was supplied by International Data Corp., a market research firm in Framingham, Mass.

The format for this week's minicomputer (and next week's microcomputer) charts are somewhat different than the format used in last week's Roundup of mainframes and superminis. Industry analysts contend that users of minis and micros, unlike users of larger systems, are more concerned about solving their business problems than knowing how much raw performance is available in their systems. For that reason, *Computerworld* has eliminated the millions of instructions per second (Mips) and relative performance categories, as well as the internal performance and buffer storage categories. In their place is information about the operating systems and communications protocols supported by the systems in the survey.

DIGITAL EQUIPMENT CORP.

System / Characteristics	PDP-11/23C	PDP-11/23+	PDP-11/24	PDP-11/44
Address Space	16 Bit	16 Bit	16 Bit	16 Bit
Communications Protocols	Asynchronous, Synchronous	Asynchronous, Synchronous	Asynchronous, Synchronous	Asynchronous, Synchronous
Memory Size in Bytes (Minimum-Maximum)	256K-4M	256K-4M	256K-4M	512K-4M
Purchase Price (Basic Configuration)	$12,000	$20,000	$30,000	$60,000
Operating Systems	RT-11, DSM11, RSTS/E, RSX-11M+	RF11, RSX-11M, RSX-11M+, RSTS/E, CTS500	RT-11, RSX-11M, RSTS/E, CTS300	RSTS/E, CTS500, RT-11, RSX-11M
I/O Ports	1	1	1	1
I/O Channel Speed (Bit/Sec)	Not Available	Not Available	Not Available	Not Available
DP Support?	Yes	Yes	Yes	Yes
WP Support?	Yes	Yes	Yes	Yes

IBM

System / Characteristics	Series/1	System/23 Datamaster	System/36
Address Space	16 Bit	8 Bit	36 Bit
Communications Protocols	Synchronous, Binary Synchronous, Asynchronous SDLC	Asynchronous Binary Synchronous SDLC	Binary Synchronous, SDLC/SNA
Memory Size in Bytes (Minimum-Maximum)	32K-512K	64K-128K	128K-512K
Purchase Price (Basic Configuration)	$30,000	$9,705	$34,000
Operating Systems	RPS, EDX, CPS	Internal	SSP
I/O Ports	Not Available	Not Available	10
I/O Channel Speed (Bit/Sec)	Not Available	Not Available	2.5M
DP Support?	Yes	Yes	Yes
WP Support?	Yes	Yes	Yes

Minicomputer Charts Continue on Page 46, 47 and 48

"No matter who you're selling to," remarks Merrill Lines, "the fact that you can go from an [illegible] LT-20 all the way to a million dollar installation without changing software or learning a new language is an incredible advantage.

"Digital has done a great job at keeping things compatible and growing," he says. "At providing easy migration paths, and linking things together more and more. With the VAX™ family I can satisfy almost any customer and keep him happy for years."

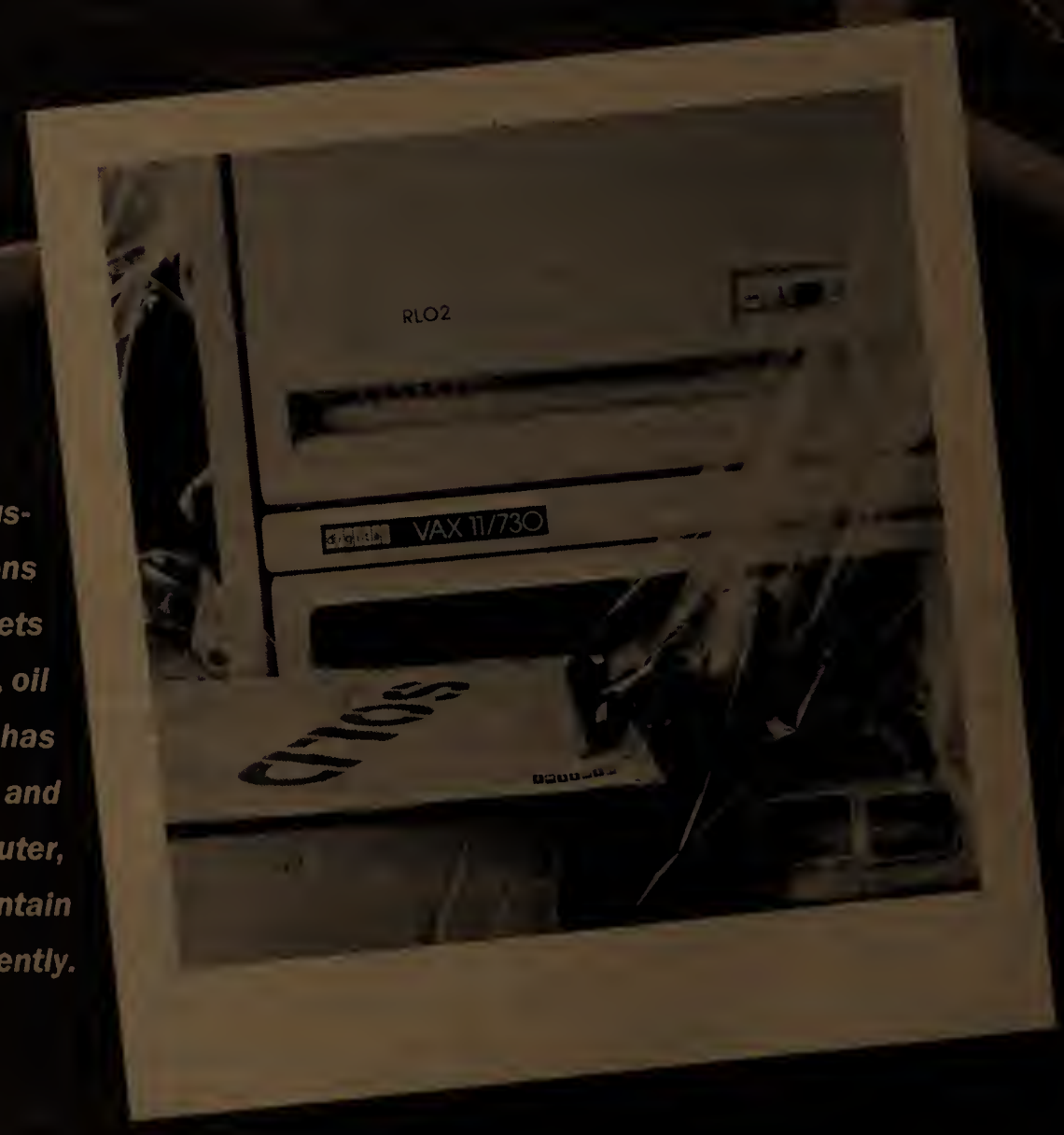
Merrill points to the VMS™ operating system as another key to VAX's commercial success. "Digital really thought it through," he remarks. "It supports all popular languages. It's terrific for interactive applications. Or transaction processing. It has exceptional data communications and mass storage. It's the most user-friendly operating system I know about."

Merrill points out that the investment in VMS software combined with the reliability of VAX hardware is quickly earning the minicomputer a reputation in commercial markets equal to what it enjoys in technical engineering circles.

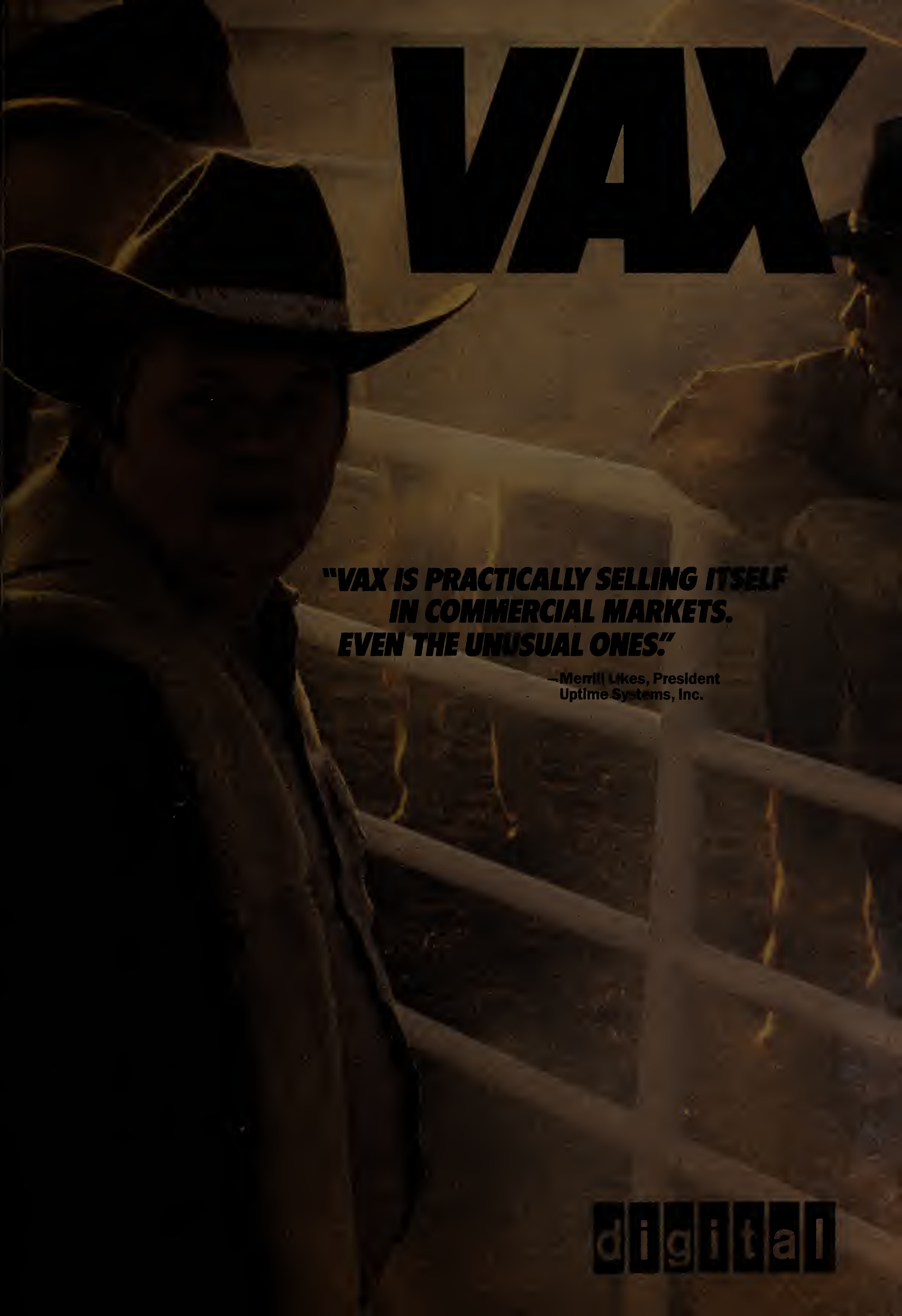
Uptime installed the first commercially-applied VAX-11/730 and had the system up and running on-site in just 90 minutes. "Some of our new customers don't believe what it can do," Merrill laughs. "So we prove it to them. VAX will carry us through the 80s. For commercial OEMs, it's becoming a classic."

To find out what VAX can do for your business, call toll-free 1-800-DIGITAL, extension 200. Or write: Digital Equipment Corporation, 200 Baker Avenue, [illegible]W94, West Concord, MA 01742.

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At Uptime Systems, they customize VAX with applications software for commercial markets like horse and cattle breeding, oil and resource exploration. VAX has made them more productive and more profitable. No other computer, they say, lets them produce, maintain and support software so efficiently.


VAX
"VAX IS PRACTICALLY SELLING ITSELF
IN COMMERCIAL MARKETS.
EVEN THE UNUSUAL ONES."
—Merrill Likes, President
Uptime Systems, Inc.
digital

WANG LABORATORIES, INC.

System / Characteristics	2200	VS/100	VS/85	VS/90
Address Space	8 Bit	32 Bit	32 Bit	32 Bit
Communications Protocols	Asynchronous, Binary Synchronous, SNA/SDLC, Wangnet	Asynchronous, Binary Synchronous, SNA/SDLC, Wangnet	Asynchronous, Binary Synchronous, SNA/SDLC, Wangnet	Asynchronous, Binary Synchronous, SNA/SDLC
Memory Size in Bytes (Minimum-Maximum)	32K-512K	256K-2M	1M-4M	1M-4M
Purchase Price (Basic Configuration)	$4,300	$8,000	$63,000	$73,000
Operating Systems	Basic 2	VS/OS	VS/OS	VS/OS
I/O Ports	3-9	8	8	8
I/O Channel Speed (Bit/Sec)	Not Applicable	5.2M	5.2M	5.2M
DP Support?	Yes	Yes	Yes	Yes
WP Support?	Yes	Yes	Yes	Yes

NCR CORP.

System / Characteristics	I-9010	I-9020	Tower 1632
Address Space	8 Bit	16 Bit	16 Bit
Communications Protocols	Binary Synchronous	Asynchronous	Asynchronous
Memory Size in Bytes (Minimum-Maximum)	48K-128K	64K-512K	512K-2M
Purchase Price (Basic Configuration)	$10,000	$20,000	$14,000
Operating Systems	IDPS	Imos III	Unix
I/O Ports	Not Available	Not Available	Not Available
I/O Channel Speed (Bit/Sec)	Not Available	Not Available	Not Available
DP Support?	Yes	Yes	Yes
WP Support?	Yes	Yes	Yes

BASIC FOUR INFORMATION SYSTEMS DIVISION, MANAGEMENT ASSISTANCE, INC.

System / Characteristics	System 110/210
Address Space	8 Bit
Communications Protocols	Synchronous
Memory Size in Bytes (Minimum-Maximum)	64K-256K
Purchase Price[1] (Basic Configuration)	$47,510
Operating Systems	Boss
I/O Ports	2
I/O Channel Speed (Bit/Sec)	To 9,600
DP Support?	Yes
WP Support?	Yes

1. For a system with 96K bytes of main memory, a 28M-byte disk drive and three terminals.

GENERAL AUTOMATION, INC.

System / Characteristics	Zebra 5000
Address Space	16/32
Communications Protocols	Asynchronous
Memory Size in Bytes (Minimum-Maximum)	1.5M
Purchase Price (Basic Configuration)	$57,000
Operating Systems	Xenix
I/O Ports	16
I/O Channel Speed (Bit/Sec)	Not Available
DP Support?	Yes
WP Support?	Yes

Charts Continued From Page 43

BURROUGHS CORP.

System / Characteristics	B20	B96[1]	B930[1]	B2925
Address Space	16 Bit	8 Bit	8 Bit	6 Digits
Communications Protocols	Binary Synchronous, SDLC, HDLC	Binary Synchronous, Asynchronous, Synchronous, SDLC, HDLC, BDLC	Binary Synchronous, Asynchronous, Synchronous, SDLC, HDLC, BDLC	Binary Synchronous, Synchronous, Asynchronous, SDLC, HDLC, BDLC
Memory Size in Bytes (Minimum-Maximum)	256K-640K	512K-1.5M	576K-3M	1M-2M
Purchase Price (Basic Configuration)	$6,695 (256K)	$29,445 (512K)	$23,228 (640K)	$145,000 (1M)
Operating Systems	Btos	CMS/MCP	CMS/MCP	MCP
I/O Ports	4-11	7-10	9[2]	5-16
I/O Channel Speed (Bit/Sec)	To 730K	1M	1M	1.2M
DP Support?	Yes	Yes	Yes	Yes
WP Support?	Yes	Yes	Yes	No

1. The B96 and B930 employ a virtual address space with a logical maximum of 24 bits. The processor, however, employs an 8-bit architecture.
2. Since between four to eight systems can be grouped in a multiprocessor configuration, the maximum number of I/O ports can vary greatly.

FOUR-PHASE SYSTEMS, INC.

System / Characteristics	IV/40	IV/50	IV/60	IV/65	IV/70
Address Space	24 Bit	24 Bit	24 Bit	24 Bit	24 Bit
Communications Protocols	Asynchronous, Synchronous, Binary Synchronous, Hasp, SDLC	Asynchronous, Synchronous, Binary Synchronous, Hasp, HDLC	Asynchronous, Synchronous, Binary Synchronous, Hasp, SDLC	Asynchronous, Synchronous, Binary Synchronous, Hasp, SDLC	Asynchronous, Synchronous, Binary Synchronous, Hasp, SDLC
Memory Size in Bytes (Minimum-Maximum)	24K-96K	24K-96K	240K-720K	288K-768K	48K-96K
Purchase Price (Basic Configuration)	$62,000	$95,000	$110,000	$130,000	$150,000
Operating Systems					
I/O Ports	Not Available	Not Available	Not Available	Not Available	Not Available
I/O Channel Speed (Bit/Sec)	Not Available	Not Available	Not Available	Not Available	Not Available
DP Support?	Yes	Yes	Yes	Yes	Yes
WP Support?	Yes	Yes	Yes	Yes	Yes

NEC INFORMATION SYSTEMS, INC.

System / Characteristics	Astra 200	Astra 220	Astra 230	Astra 250	Astra 270
Address Space	16 Bit	16 Bit	16 Bit	16 Bit	16 Bit
Communications Protocols	Asynchronous, Synchronous, 3780	3270, 3780, 3770, SNA, HDLC, X.25	3270, 3780, 3770, SNA, HDLC, X.25	3270, 3780, 3770, SNA, HDLC, X.25	3270, 3780, 3770, SNA, HDLC
Memory Size in Bytes (Minimum-Maximum)	384K-512K	384K-512K	384K-512K	384K-768K	384K-1M
Purchase Price[1] (Basic Configuration)	$8,000	$12,000	$16,000	$35,000	$45,000
Operating Systems	Itos	Itos	Itos	Itos	Itos
I/O Ports	3	7	13	18	27
I/O Channel Speed (Bit/Sec)	To 8M	Not Available	Not Available	Not Available	Not Available
DP Support?	Yes	Yes	Yes	Yes	Yes
WP Support?	Yes	Yes	Yes	Yes	Yes

1. Including printer.

Minicomputers

From the Top 20 Minicomputer Vendors

More Charts on Page 48

MICRODATA CORP.

Characteristics \ System	Realty 4700	Sequel 175/3200
Address Space	8 Bit	32 Bit
Communications Protocols	Binary Synchronous	Asynchronous
Memory Size in Bytes (Minimum-Maximum)	64K-512K	512K-4M
Purchase Price (Basic Configuration)	$27,000[1]	$136,000[2]
Operating Systems	Internal	Internal
I/O Ports	8-48	8-128
I/O Channel Speed (Bit/Sec)	Not Available	Not Available
DP Support?	Yes	Yes
WP Support?	Yes	Yes

1. Includes 64K bytes of main memory, a 100 in./sec 1,600 bit/sec streaming tape drive and 32M-byte disk subsystem.
2. Includes 512K bytes of main memory, a 100/50 in./sec dual-density streaming tape drive, 128M-byte disk subsystem and eight I/O ports.

HARRIS CORP.

Characteristics \ System	9015	9020
Address Space	16 Bit	16 Bit
Communications Protocols	Asynchronous	Asynchronous Binary Synchronous
Memory Size in Bytes (Minimum-Maximum)	512K	512K-1M
Purchase Price (Basic Configuration)	$9,300	$27,250
Operating Systems	CP/M 86, MS/DOS	CP/M 86, MS/DOS
I/O Ports	Not Available	Not Available
I/O Channel Speed (Bit/Sec)	Not Available	Not Available
DP Support?	Yes	Yes
WP Support?	Yes	Yes

DATAPOINT CORP.

Characteristics \ System	Datapoint 1550/2150	Datapoint 1800
Address Space	8 Bit	8 Bit
Communications Protocols	Synchronous, Asynchronous	Synchronous, Asynchronous, SDLC, Binary Synchronous
Memory Size in Bytes (Minimum-Maximum)	32K-96K	64K-128K
Purchase Price (Basic Configuration)	$9,725	$11,770
Operating Systems	DOS-H	DOS
I/O Ports	2	1
I/O Channel Speed (Bit/Sec)	To 9,600	To 9,600
DP Support?	Yes	Yes
WP Support?	Yes	Yes

HEWLETT-PACKARD CO.

Characteristics \ System	HP 250	HP 1000 Model 5 Microsystem
Address Space	16 Bit	16 Bit
Communications Protocols	Synchronous, Asynchronous	Asynchronous, HDLC
Memory Size in Bytes (Minimum-Maximum)	256K-576K	64K-512K
Purchase Price[1] (Basic Configuration)	$15,250	$4,750
Operating Systems	HP 250	RTE-L RTE-XL
I/O Ports	5	8
I/O Channel Speed (Bit/Sec)	To 9,600	Not Available
DP Support?	Yes	Yes
WP Support?	Yes	Yes

1. Base list price.

TANDEM COMPUTERS, INC.

Characteristics \ System	Nonstop	Nonstop II
Address Space	16 Bit	16 Bit
Communications Protocols	Asynchronous, Synchronous, Binary Synchronous, SDLC, HDLC, Hasp	Asynchronous, Synchronous, Binary Synchronous, SDLC, HDLC, Hasp
Memory Size in Bytes (Minimum-Maximum)	1.5M-2M	768K-8M
Purchase Price (Basic Configuration)	$126,000	$200,000
Operating Systems	Guardian	Guardian
I/O Ports	Not Available	Not Available
I/O Channel Speed (Bit/Sec)	Not Available	Not Available
DP Support?	Yes	Yes
WP Support?	Yes	Yes

HONEYWELL, INC.

Characteristics \ System	6/20	Micro 6/40	Micro 6/74
Address Space	16 Bit	16 Bit	16 Bit
Communications Protocols	Asynchronous	Asynchronous	Asynchronous
Memory Size in Bytes (Minimum-Maximum)	512K-1M	512K-1M	512K-2M
Purchase Price[1] (Basic Configuration)	$27,295	$38,400	$81,795
Operating Systems	Gcos	Gcos	Gcos
I/O Ports	5	4-28	2-64
I/O Channel Speed (Bit/Sec)	1.2M	1.2M	1.2M
DP Support?	Yes	Yes	Yes
WP Support?	Yes	Yes	Yes

1. Includes processor, console and 80M-byte disk drive.

TEXAS INSTRUMENTS, INC.

Characteristics \ System	Business System 600	Business System 800
Address Space	16 Bit	16 Bit
Communications Protocols	SDLC, 3270, 2880, X.25	SDLC, 3270, 2880, X.25
Memory Size in Bytes (Minimum-Maximum)	256K-2M	512K-2M
Purchase Price (Basic Configuration)	$28,300	$50,340
Operating Systems	DX10, Dnos	DX10, Dnos
I/O Ports	16	40
I/O Channel Speed (Bit/Sec)	To 6M	To 6M
DP Support?	Yes	Yes
WP Support?	Yes	Yes

Minicomputers

Continued from Page 47

NIXDORF COMPUTER CORP.			
System / Characteristics	8845	8860	8870
Address Space	16 Bit	16 Bit	16 Bit
Communications Protocols	Synchronous, Binary Synchronous	Asynchronous, Synchronous	Asynchronous, Synchronous, X.25
Memory Size in Bytes (Minimum-Maximum)	128K	512K-1M	96K-1M
Purchase Price (Basic Configuration)	$30,000	$18,000	$22,500
Operating Systems	Nios	Dipos	Dipos
I/O Ports	Not Available	Not Available	1-24
I/O Channel Speed (Bit/Sec)	Not Available	Not Available	Not Available
DP Support?	Yes	Yes	Yes
WP Support?	Yes	Yes	Yes

MDS QANTEL CORP.		
System / Characteristics	Model 110, 120	Model 220, 231
Address Space	16 Bit	16 Bit
Communications Protocols	Asynchronous	Asynchronous, Synchronous
Memory Size in Bytes (Minimum-Maximum)	49K-64K	64K-256K
Purchase Price[1] (Basic Configuration)	$14,440	$35,950
Operating Systems	Best, Best/(AOS)	Best, Best/(AOS)
I/O Ports	5	2
I/O Channel Speed (Bit/Sec)	Not Available	To 9,600
DP Support?	Yes	Yes
WP Support?	Yes	Yes

1. Base list price.

POINT 4 DATA CORP.		
System / Characteristics	Mark 5	Mark 8
Address Space	16 Bit	16 Bit
Communications Protocols	Asynchronous	Asynchronous
Memory Size in Bytes (Minimum-Maximum)	64K-128M	64K-128K
Purchase Price (Basic Configuration)	$5,000	$6,000
Operating Systems	Iris, CP/M	Iris, CP/M
I/O Ports	Not Available	Not Available
I/O Channel Speed (Bit/Sec)	Not Available	Not Available
DP Support?	Yes	Yes
WP Support?	Yes	Yes

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EDITORIAL

No More Than a Promise?

U.S. Federal District Court Judge Harold Greene has apparently settled — finally — the U.S. vs. AT&T antitrust case on terms that could make the telecommunications industry more competitive. But Greene's decision leaves one nagging question unanswered: Why wasn't U.S. Assistant Attorney General William Baxter able two years ago to exact concessions from AT&T similar to those recently imposed on the phone company by Greene?

Perhaps the telephone company was not as desperate for a settlement two years ago. If you look at the record, however, it seems that another conclusion is inescapable.

In April 1981, Baxter vowed to "litigate the case to the eyeballs." That statement was made shortly after he received a letter from the U.S. Department of Defense asking dismissal of the government's charges against Bell.

Two months later, however, Baxter asked Greene to suspend the trial for several months so Congress could pass a telecommunications rewrite bill, S. 898, favored by the Reagan administration. "It would be the administration's intention to discontinue the litigation" if Congress passed the bill, Baxter said.

This idea had originated a few months earlier in a report approved by a White House group known as the Cabinet Council on Trade and Commerce, headed by Secretary of Commerce Malcolm Baldridge. The president "determined that the administration should strongly support S. 898," provided certain amendments were added, Baldridge later told the Senate Judiciary Committee.

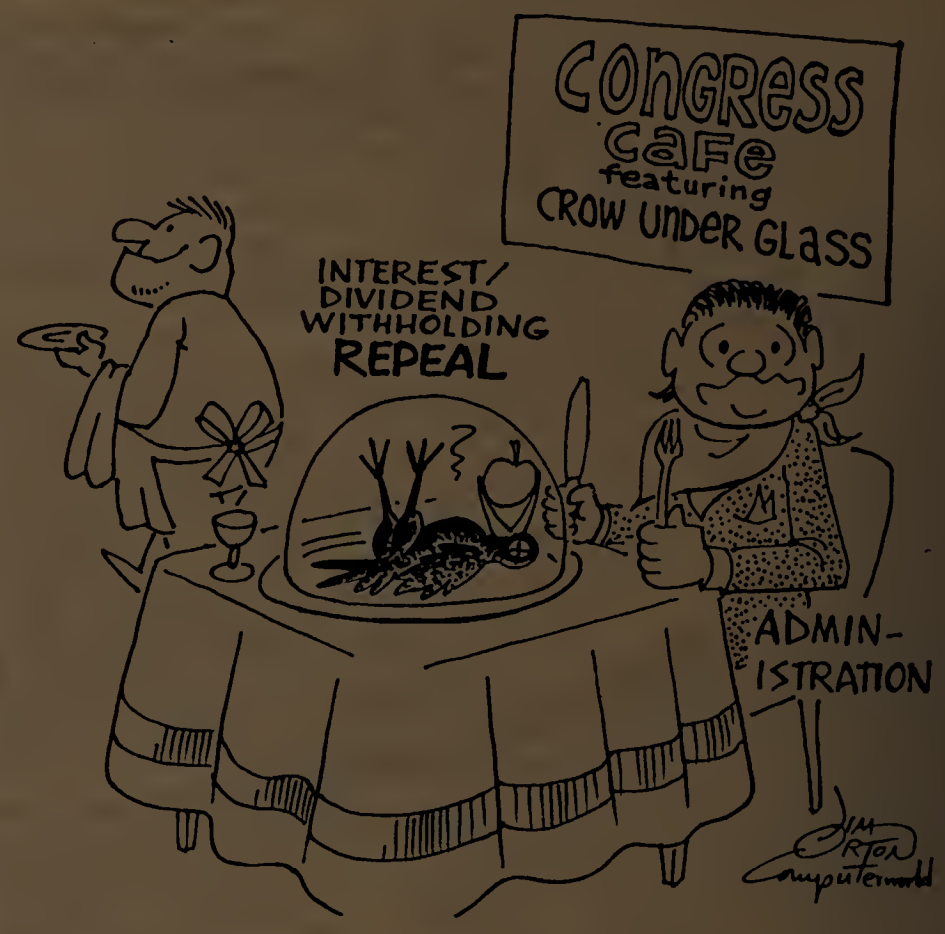
Greene shot down this plan in short order, however, by denying the suspension request. Less than a month later, on Aug. 24, 1981, he chastised the Defense Department for letting AT&T help it prepare a report on the effects of divestiture and for letting the phone company use the report in its defense against the government's antitrust charges. The report concluded that breakup of AT&T would harm national security.

What caused the Reagan administration to change its mind about the case? Possibly, it suspected that Baxter and his staff had been too effective. On June 25, 1981, Greene, in the course of denying an AT&T request for quick action on its petition for dismissal of the government's charges, observed that "the government has presented a respectable case." The following September, he denied the dismissal motion. The government had demonstrated that Bell "has violated the antitrust laws in a number of ways over a lengthy period of time," Greene observed.

On Jan. 8, 1982, AT&T and the U.S. Justice Department jointly announced a proposed settlement of the case. The terms were considerably more favorable to the phone company than those subsequently imposed by Greene.

If Baxter had insisted on such conditions late in '81, there is at least a possibility the final settlement would have been reached far sooner, at much less cost to the nation's taxpayers and communications ratepayers. But even more important, Baxter's acceptance of half a loaf suggests that the Reagan administration's professed support of free enterprise is limited to only certain free enterprisers.

This attitude may continue to be a problem, since the Justice Department will be the primary enforcer of the settlement dictated by Greene. As a result, the promised increase in competition may turn out to be no more than that.



LETTERS

Data Base Coverage

I was pleased to see coverage of data base machines in *Computerworld*. Although Vincent C. Rauzino's In Depth article "The Present and Possible Future of Data Base Machines" [CW, June 6] is, in general, a good article, Rauzino has missed a few important facts about the data base machines mentioned in the article.

I would first like to point out that the Amperif Corp. RDM-1100 is not only remarkably similar to the IDM-500, it is an IDM-500. The U.S. Navy is one of Amperif's three RDM-1100 customers, with a system at the Pacific Missile Test Center at Point Mugu, Calif.

The preprocessor Rauzino discusses is only in error, as the accelerator is an add-on board that can be plugged into any IDM-500 and has been demonstrated at another Navy activity to improve complex query processing speed by almost an order of magnitude.

In discussing the Mega/NET system from Digital American Computer, Inc., a significant fact left out is that the system is based on Perkin-Elmer Corp. 3200 series minicomputers.

I have discussed the product with Peter Richards, president of Digital American Computer, and determined that although not a dedicated, special-function device like the IDM-500 or Intel Corp.'s IDBP, it is a product that has potential in a network environment. In this sense, it is not unlike the Encompass system from Tandem Computers, Inc.

As a general comment on another part of the article, the negatives discussed are only partly relevant. With the fastest growing area of data processing being the use of data base systems, to say that conversion to a data base machine is a drawback is shortsighted.

The development backlog at many DP shops is enough to justify and fill a data base machine, leaving conversion to be handled in the normal three to five year redesign cycle attributed to commercial DP shops. Besides which, how else to introduce a new capability — that is, relational technology and associated SQL like user-friendly query languages — than adding a data base machine and trying it out.

My own experience has been that they are well received by end users and analysts alike because they offered the capability to do some things that were impossible beforehand.

I look forward to more coverage of data base machines in *Computerworld*.

Frank Malabarba
Chairman, Navy Data Machine Working Group
Head, Technology Division
Naval Data Automation Command
Point Mugu, Calif.

Systematic Approach

In "Why Are Users Getting Untested Programs?" [CW, Aug. 1], the consultants interviewed for the article noted the lack of a systematic approach or methodology for software testing.

For those wishing a systematic approach, I recommend the following two actions: Use the Institute of Electrical and Electronics Engineers (IEEE) — soon to be American National Standards Institute — standard for software test documentation to help define the necessary documents; or join the working group developing a standard for software unit testing.

Working group membership is open to all.

David Gelperin
Chairman
IEEE Task Group On Software Unit Testing
Golden Valley, Minn.

SOFTLINE /Werner L. Frank‡

Structured vs. Prototyping Methodology

'There is often confusion when considering the use of programming techniques based on structured methodologies vs. prototyping of applications software. It is a common belief that the former is appropriate to the professional programmer, while the latter is identified with making software development simpler for end users. In fact, prototyping could easily be mistaken as a technique to be used solely for end-user programming. Actually, both methodologies can apply to each type of implementor.'

It seems that there are two schools of thought on the subject of software development methodology, and they appear to be diametrically opposite in purpose and approach. One of these methods advocates a strict discipline of determining requirements, careful systems analysis, formal documentation of specifications and subsequent disciplined construction of software. This is accomplished through structured analysis of the application and employing the techniques of structured programming for its implementation.

The second view adopts the seemingly more carefree, ad hoc concept of prototyping, namely, more quickly rendering operational what appear to be the requirements of an end user through experimentation and a show-and-tell scenario.

Is there a place in software development for both of these alternative schemes? Are they a contradiction in terms, or are they complementary methodologies?

There is often confusion when considering the use of programming techniques based on structured methodologies vs. prototyping of applications software. It is a common belief that the former is appropriate to the professional programmer, while the latter is identified with making software development simpler for end users. In fact, prototyping could easily be mistaken as a technique to be used solely for end-user programming.

Actually, both methodologies can apply to each type of implementor. The professional DP practitioner will benefit from either of the two approaches, as will the end user. It is not the development methodology that is distinctive and relevant to one type of implementor vs. another, but rather the selected language syntax and its degree of usability in a specific environment.

Second Confusion

A second confusion may come about due to the belief that prototyping is associated with nonprocedural languages, while structured programming is directed for use with algorithmic procedures. This manner of thinking may also raise other confusing points, namely, that prototyping has something to do with building applications that have limited interest, that such programs have short lives or that they are programs that perform ad hoc reporting. All of these factors may be present in building an application, but they are independent of the issue of selecting structured vs. prototyping approaches.

But before clarifying these issues, a review of some history might be helpful. What gave rise to these distinctive methodologies? In both cases, we are concerned with the software implementation process, from conception of the requirements through placing the system into operation. That is to say, we are seeking software construction productivity enhancement over the entire software life cycle, including:

- Feasibility.
- Requirements.
- Design.
- Specification.
- Programming.
- Testing.
- Installation.
- Operation.
- Maintenance.

Two objectives for these methods are clear:

- Decrease the overall cost of the implementation.
- Assure the highest degree of responsiveness of the software to the actual requirements of the final user.

The craze for structured this and structured that evolved from two quite different corners of computer activity. The first influence derived from the more theoretical wings of the computer world. These are the students of program architecture and logic flow who arrived on the scene with the conviction that algorithmic formulations of computer applications via procedural languages can be done better in the company of structure, be it a more appropriate set of commands or the format in which code is actually composed. This wing could well be dubbed the "go-to less, paragraph indenters" programming advocates.

A second source of concern and interest for bringing order to the programming task came from those responsible for the life cycle well-being of computer programs. These folks dismayed over the horrendous task of maintaining bodies of software in the presence of poor documentation and ever-changing personnel. This faction might be called the "spaghetti unravelers," concerned with the elimination of confusion and endless paths that are too often present in a computer program.

Ultimate Support

While these influences may have created the initial enthusiasm for a structured discipline in design and programming efforts, the ultimate support for these methods came from the overall desire to improve the integrity of software. Structured approaches were deemed to provide the means to uncover clearer understanding of users' needs, together with ending up with more reliable code. The emphasis, therefore, in

(Continued on Page 52)

HUMAN CONNECTION /Jack Stone‡

A Nation of Computer Illiterates

Time magazine's optimistic coverage of personal computers in its Jan. 3, 1983 "Machine of the Year" issue captured the essence of the developing marketplace in these memorable words: "Whatever its variations, there is an inevitability about the computerization of America. Commercial efficency requires it, Big Government requires it, modern life requires it, and so it is coming to pass."

The first step in making it come to pass is computer literacy — for everyone.

Time's reporting is only a sample of the torrent of publicity surrounding the rapid growth of these machines around the world, in all sectors of Western societies — industry, education, science and government. No one can escape the conclusion that the personal systems make up a very important part of our lives, either directly or indirectly, and that in the future, their influences will surely increase in the work place, the school and the home.

Consequently, the needs of the population at large for an understanding of the technology is surely obvious by now, having received extensive coverage in the public and academic press.

The media have enthusiastically reported on numerous valuable and creative efforts under way in many areas to bring such instruction into the classroom.

Small Percentage

Yet in spite of some impressive successes, it turns out that only a small percentage of the total population has been able to attend such courses; this is due to the relatively high cost and limited availability of these courses. Take, for example, the current situation in American schools: There are about 100,000 systems in these institutions today. On the surface, this figure seems to be large; but when prorated against the total population, there is only one for about every 400 pupils.

The plain fact is that from the perspective of current knowledge of computers relative to the totality of needs, the nation is terribly illiterate.

This conclusion was confirmed just a few months ago when a federal government commission recommended a major reorientation of the high school curriculum to improve the excellence of math and science education, including a half year of basic education in computer science for every student. Happily, recent events have indicated that state and local leaders have taken the admonition to heart and actively debated what should be done.

What It Takes

Although there is no general agreement within academia or the industry on what it takes for an individual to build a competency in computers, it is certain that at least American school children have got it. On this point, Louis Robinson, director of university relations for IBM, recently stated in *The New York Times*, March 30, 1983, that "Computer literacy is more often defined as the ability to use computer technology in a particular discipline. It does not imply that the person is a world-class programmer. It is a skill like driving an automobile and being able to get to Cape Cod, for example. That is very different from knowing how to take a car's transmission apart. Kids, as well as adults, can be taught computer literacy."

School children set a torrid pace for adults, the vast majority of whom are concerned about their own capabilities for comprehending something that seems to be as complex or abstract as a computing machine. Kids have had too little experience in life to have developed fears or biases toward these devices, and they certainly don't have jobs or social pressures as excuses.

Most importantly, the average grade schooler chooses to learn about the machines, and quite frankly, there is absolutely no reason why any serious-minded adult cannot make the same decision.

But the machines aren't all that easy for adult beginners. The author agrees with *Time*'s assessment of this matter: "Certainly, the personal computer is not without its flaws. As most new buyers soon learn, it is not that easy for a novice to use, particularly when the manuals contain [highly technical] instructions."

Letters to Stone should be addressed to him at Box 270, 1377 K St. N.W., Washington, D.C. 20005.

Comparing Software Development Schemes

(Continued from Page 51)

structured design and structured programming was to achieve two aspects of reliability for applications systems:

- That the system have a minimum of errors.
- That the system match the requirements of the ultimate user.

Clearly, the structured approach for developing software, combined with adequate inspection techniques, meet rather well the first objective, and perhaps not as well the second. For how can the systems analyst be assured that his perception of the requirements really reflects the needs of the end-user customers?

It is, undoubtedly, because of the last question that the prototyping enthusiasts first came to the forefront. It was observed that systems analysts and end users often had difficulty in communicating, both verbally and through the written word. It was hard for the user to understand and express requirements, and it was equally difficult for the programmer/analyst to perceive the needs. Setting up a prototype allowed the user not only to test out understanding, but also permitted an iterative process for articulating the requirements through live and active demonstrations rather than a bland paper design.

One could argue, however, that prototyping really came about as a result of the emergence of two technical tools: the data management system and automated screen painting. This combination of support software provides the ready means to accomplish a significant reduction in software implementation time, in some cases by an order of magnitude.

Indeed, this technology has even been designated as fourth-generation capability to underline the leverage achievable in implementing an application. It was found, for instance, that reasonably complex applications can become operational in a matter of days, and with associated powerful report writers and screen dialogue generators, the application can be quickly modified in trying out various processing and presentation schemes.

So why not use this high-powered tool in an existential process with the user. The "try it, you'll like it" test for ascertaining user-functional requirements, on the one hand, and user preferences for presentation style, on the other hand, could be cheaply achieved via this technique. Having the capability and using it may be the major reason for inventing a term describing it, namely, "prototyping."

Real Dangers

But that is not necessarily what happens in real life. In fact, there are some real dangers in putting the prototyping capability into the hands of applications builders. The easy tendency is simply to leave the prototype in place for operational use, skip the hard part of documentation and building the application once more by more traditional schemes and go on to another project.

But why not accept such a situation. After all, this obeys one of the fundamental precepts of life: If it works, leave it alone. But the critics would point out that prototyping leads to slipshod results, employs shortcuts and bypasses careful and perhaps exhaustive system analysis and adequate testing and documentation. The method is sometimes negatively described as a trial-and-error approach and is likened to shooting from the hips.

Yet one can point out the best of scientific and engineering methods that have adopted prototyping as the key to their development. This is the case in the use of wind tunnels for developing airfoils and aircraft, as well as the ship model basins employed in testing out new boat designs. These techniques have now been largely supplanted by computer modeling and simulation. So why not use the computer in the same kind of a role when it comes to designing computer applications themselves?

The analogy falls short because unlike the case of airplanes and boats, where prototyping necessarily leads to a subsequent production cycle, a software prototype can become the final product.

Software builders should use both prototyping and structured techniques, perhaps in that order. In such a world, perhaps one can have it both ways. Prototyping can sharpen the translation of user requirements into a satisfactory human interface for I/O formats and procedures, while the structured programming effort will assure implementation completeness and reliability.

Frank is an independent consultant and president of the Werner Frank Computer Group located in Calabasas, Calif.



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Manages $8.5 Billion Program

Tracking System Keeps MTA in Line

NEW YORK — Faced with a drop in ridership on its subway and bus facilities of more than 22% between 1970 and 1980, the New York Metropolitan Transportation Authority (MTA) was forced to take action.

Lee Hennig, director of the MTA capital program administration, said the action was to undertake a five-year, $8.5 billion capital improvement program that is being managed by a computer-based project tracking system developed by Multiplications, Inc. of Cambridge, Mass., with its Accolade CICS application development system.

The MTA determined that it would cost well over $55 billion to replace its transit assets. Based on their useful life, it was felt that the MTA should be spending over $1 billion per year for capital reinvestment. However, financial constraints on the MTA's funding sources — New York City and surrounding counties and state and federal governments — have limited that reinvestment to about $300 million a year, which was far too little to do the job.

'In mid-1981, the MTA began to reorganize to resolve the internal problems that it had previously experienced in managing capital projects and monitoring outside design and construction work. [A computer-based] system was operational and fully under MTA control on March 31, 1983.'

Hennig recalled that during the 1970s, the transit agencies in New York were criticized for delays that occurred as a result of capital project approval and administration procedures. To address this problem, the state legislature approved legislation in 1981 that centralized approval procedures for capital projects within the MTA.

In mid-1981, the MTA began to reorganize to resolve the internal problems that it had previously experienced in managing capital projects and monitoring outside design and construction work. "Management understood that the scope of the new five-year program would only compound those problems," Hennig said. "If the $8.5 billion budget were to be divided into daily increments, MTA managers would be responsible for administering over $32.5 million in capital construction expenditures every working day — expenditures distributed over scores of projects, hundreds of contractors and thousands of vendors, generating millions of pieces of information to be recorded, managed and

(Continued on Page 54)

Sage Decision Support System Available for IBM VM/CMS

PRINCETON, N.J. — Sage Data, Inc. has announced that its Sage System menu-driven decision support system is available for the IBM VM/CMS environment.

Utilizing a menu structure, the Sage System provides an end-user-oriented environment for time-series analysis, modeling, forecasting and preparation of presentation graphics and reports, the vendor claimed, Users are prompted to select their next command, which may be abbreviated to a single character.

All Sage System functions are fully integrated and have a common command structure. Movement through data analysis, modeling, reporting and graphics is user-transparent. The package can also be integrated with Issco, Inc.'s Tell-A-Graf to produce graphics output.

The Sage System costs $45,000 for a permanent license, $15,000 for an annual license and $1,500 on a monthly basis. Sage Data is located at 104 Carnegie Center, Princeton, N.J. 08540.

Tape Management Series Out

JERICHO, N.Y. — Computer Associates International, Inc. has introduced a tape management family for the IBM VM/CMS environment.

The CA-Dynam/CMS family comprises the CA-Dynam/T tape management system and the CA-Dynam/B backup and restore facility. Together, the packages are said to provide CMS file control and efficient use of tape and direct-access storage device resources for IBM and compatible mainframes operating under VM/370 Release 6 with basic systems extension programs product/systems extension programs product and all releases of VM/SP.

CA-Dynam/T costs $5,500 for a three-year lease, and CA-Dynam/B costs $3,000 for a three-year lease. Both can be purchased for $7,000 on a three-year lease. Computer Associates International is located at 125 Jericho Tnpk., Jericho, N.Y. 11753.

Productivity Tools: An Effective Aid For the DP Manager

By Charles Wang
Special to CW‡

Today's data center manager is faced with an increasing demand to manage his area of responsibility according to the same professional standards demanded of his corporate colleagues. However, he is still faced with the task of filling a five-pound bag with 10 pounds of grain. Often, programmer productivity software can help minimize the strain.

In most installations, there are five main budget items to consider: hardware, personnel, maintenance, software and computer supplies/environment.

Hardware. Expenditures include acquisition and disposition of each piece of hardware and any upgrades for additional equipment. It is the DP manager's job to know when contracts expire, whether to retain or dispose of expired equipment and how much more equipment will be needed based on growth projections.

The manager should also keep track

(Continued on Page 56)

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System Keeps New York's MTA on Track

(Continued from Page 53)
analyzed," he explained.

The task of managing all of that information fell to Central Tracking (Centrak), the system designed by Multiplications. "Effective management of a capital program as large as this one requires timely review of all relevant information," according to Mortimer Downey, the MTA's deputy executive director for capital programs. "We have developed a system that can manage the vast amounts of information we need to control costs and schedules." Centrak performs that management function for all four of the operating agencies of the MTA: the MTA "home office," the Long Island Railroad, Metro-North and the New York City Transit Authority.

Centrak was designed to give MTA management the ability to determine the current status of every project. It allows managers to track procurement activities, work orders, contract payments and identify quickly any delays or potential cost overruns. Downey described it as "our early warning system."

Programming of the massive, 136-screen Centrak system began April 15, 1982 using the Accolade application generator system. Initial operation of a portion of the system began on July 1, 1982. The entire system was operational and fully under MTA control on March 31, 1983, making Centrak the first major project actually completed under the $8.5 billion program. "We had a system in place in only twelve months," Hennig said.

Centrak is on-line and menu-driven, he explained, providing instant access to all users. Currently, there are 55 CRT terminals in use at the MTA. MTA programmers will continue to use Accolade to build additional applications.

Tess Czajkowski, on-line systems manager for the MTA, said, "Accolade takes the drudgery out of programming by generating the required code for an on-line application, yet it allows the programmer the flexibility to flesh out the skeleton generated."

All of Centrak's functions are integrated through a common data base. According to Hennig, this means that initiation of a contract change order will automatically update appropriate budgets and that changing estimates of cost-to-complete for a subcontract can automatically update the forecasted cost-to-complete of an entire project. "When data is entered into the system, it becomes immediately available to all users," he added.

Centrak has a password security system that allows the manager to define who may have access to what data and even what kind of access, he continued.

The 10 Centrak subsystems that share the common data base are budget/funding; scheduling/resource allocation; task detailing; procurement; real estate; change order; contract payment; force account; system reporting; and system maintenance.

To satisfy the requirements for integration and information transfer, data is linked using a logical, hierarchical coding structure. Every piece of cost accounting information is tied to the coding structure, which reflects three different dimensions: physical work structure, such as project; responsibility structure; and source of funds.

Hennig explained that this classification scheme and the different levels of detail afforded every piece of information enables a broad range of reports to be produced for every participant involved with the capital program development.

Restore Systems Target IBM VM Environments

DANVILLE, Calif. — Calview Management, Inc. has introduced two software products for IBM VM installations.

The Backup Restore System (BRS-VM) is said to allow on-line backup and recovery of CMS files in the VM environment. BRS-VM employs an installation-based approach to the backup process that offers increased security and management control, according to the vendor.

The Archive Restore System (ARS-VM) manages the archiving of CMS files in VM environments. It reportedly enables an installation to implement an archival process for VM on a systemwide basis. Restoration of archived files may be initiated on-line by end users without the help of support personnel, the vendor claimed.

BRS-VM and ARS-VM cost $8,000 each or can be purchased together for $12,000 from Calview Management, Suite 378, 560 S. Hartz Ave., Danville, Calif. 94526.

SCA Upgrades DCR for IBM

HERNDON, Va. — Software Corp. of America (SCA) has upgraded its Data Check Recovery (DCR) system to support IBM's MVS/Extended Architecture.

DCR is a utility software system that recovers data that has become unreadable due to a permanent I/O error.

DCR is available for $2,950 per CPU or $4,900 for a site license for installations with two or more processors. SCA is located at 455 Carlisle Drive, Herndon, Va. 22070.

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With ISSCO graphics software your computers can produce artist-quality charts and graphs. No more fuzzy letters and frazzled images. ISSCO computer graphics are always sharp and clear. What's more, you'll enjoy layout freedom and can choose from a variety of graphic enhancements that let you tailor a chart exactly to your needs.

ISSCO software is especially useful for management presentations. It lets you access data directly from your computers and reproduce it on paper, overhead transparencies or 35mm slides. And you'll always get professional results.

Honeywell Adds Interactive Data Base Package

WALTHAM, Mass. — Honeywell, Inc. has announced an on-line interactive data base package for point-of-business use by distributors. The package was designed for use with the firm's DPS 6 and Level 6 lines of small systems.

Called HDS/6 (Honeywell Distribution System), the package will be marketed to distributors in the electrical apparatus and equipment, construction materials, plumbing and heating equipment and supplies, warm air heating and air conditioning, refrigeration and industrial supply businesses.

Modules available with the package include management information, order entry and invoicing, purchasing and receiving, accounts receivable, pricing, administration/security, inventory management, sales analysis, general ledger and accounts payable and physical inventory, the vendor said.

The package costs $59,500 for a one-time license fee. An entry-level HDS/6 running under the company's Gcos MOD 400 operating system can be used on a minimum-configuration DPS 6 processor with 1M byte of main memory, a CRT terminal, remote printer, disk drive and a Model 400 Transaction Processing System 6 and sort utility.

More information is available from Honeywell at 200 Smith St., Waltham, Mass. 02154.

System Supports On-Line Output Reports

ROCKVILLE CENTER, N.Y. — An on-line output report management system has been introduced by RSD America, Inc.

Writer Scanning Facility (WSF2), is designed for IBM's 370, 30 series and 4300 series computers running under IBM's MVS or VS1 operating systems, according to the vendor. It reportedly requires no system modifications.

WSF2, RSD said, will automate and suppress manual checking of control lists, paper handling, report distribution and printout lags. It also provides automatic checking of system output or user-defined outputs for exception conditions, instant on-line access to all outputs including errors, security, and confidentiality.

The package is available for $25,000. Further information is available from RSD America, Suite 402, E. Building, 100 Merrick Road, Rockville Center, N.Y. 11570.

'Docu/Master' Gets Update

NORWALK, Conn. — A new release of its document storage and retrieval system for IBM mainframes has been announced by TSI International, the systems software company of Dun & Bradstreet, Inc.

Release 2.2 of Docu/Master adds several foreign language options and enhancements to the system's search capabilities. A separate standard language is allowed for each terminal defined in the system, while command language, system responses and error messages have been translated to French and German.

Docu/Master runs on IBM 360, 370, 30 series, 4300 series or compatible mainframes under IBM's DOS/VSE, VS1 and MVS operating systems and requires a minimum 90K bytes of memory.

Prices for basic systems start at $32,200, and term contracts are available. TSI International is located at 187 Danbury Road, Wilton, Conn. 06897.

'Bams' Handles Bidding, Procurement Applications

GAINESVILLE, Fla. — Info Tech, Inc. has announced the Bid Analysis and Management System (Bams) for use with the IBM MVS operating system with TSO and IBM VM/CMS environments.

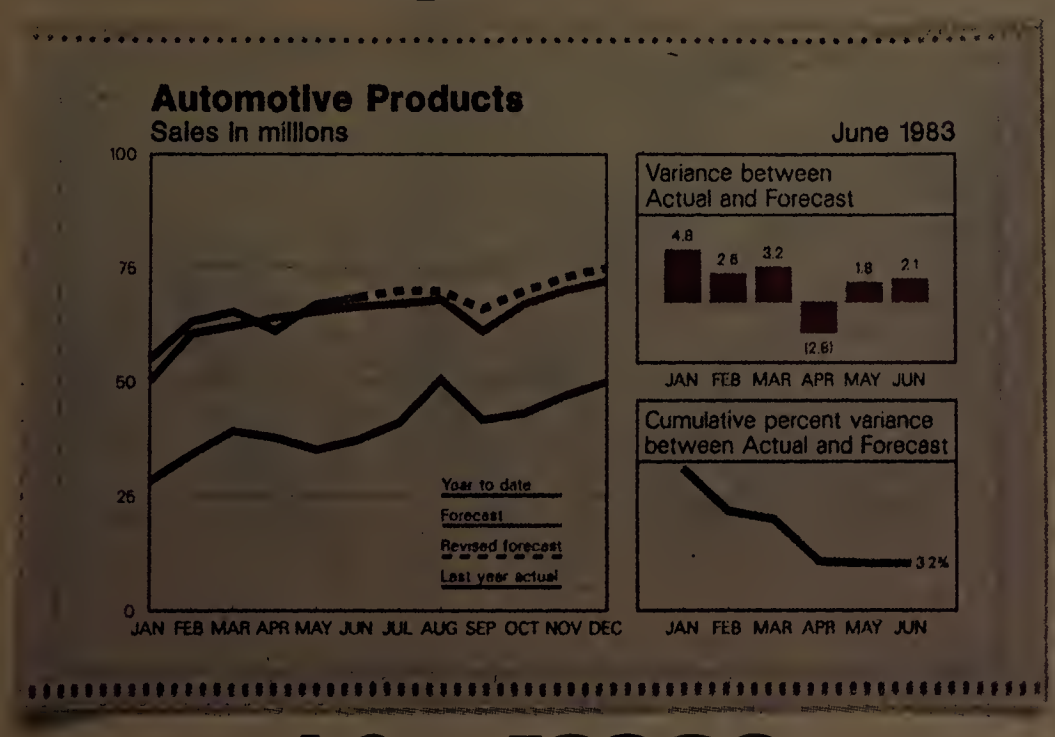
The package is a decision support system that integrates data management, reporting, analysis and graphics. The package was designed for procurement and bidding applications, the vendor said.

Information covering the contracting process, from planning and estimation through contract completion is accessable via the Bams package. The information can be used for analysis, graphics output and reports. Other features include automated proposal generation, cost estimation, bid tab generation, vendor qualification and market performance evaluation, the vendor said.

Also included in the Bams package are tools to develop and maintain historical data, application/analysis programs and a menu-oriented user interface.

The package costs $75,000 including consulting, installation support and product training from Info Tech through P.O. Box 14545, Gainesville, Fla. 32604.

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Productivity Tools Can Ease Managers' Burden

(Continued from Page 53)

of sales tax, investment tax credits, depreciation and amortization and current and projected future market values.

Managers should be aware of the wide range of performance related to the system software products available.

They should also be aware of the hidden costs involved in hardware upgrades and the need to modify the computer room and the current software to take full advantage of new hardware equipment.

Personnel. Believe it or not, the DP department is one of the most labor-intensive operations around. The computer itself is dependent on constant human intervention in the flow of jobs being processed. When preparing budgets to handle increased work loads, DP managers should pay attention to using cost-effective operations management software.

Careful attention should also be paid to program development. A major part of the programming function is clerical.

The processes of coding, debugging, documentation and maintenance could be made more productive if the right software tools were made available to the programmers.

A large portion of DP resources are also committed to servicing end-user requests for information. By giving these departments the means to service their own requests through advanced software tools, such as interactive user-friendly query languages and nonprocedural applications development systems, the DP labor cost can be significantly reduced.

Maintenance. A DP manager must know the terms of maintenance contracts, standard and overtime service arrangements, whether servicing was performed for bills received, when it will be needed in the future and whether it should be done by an independent servicing bureau. Financial planning and modeling systems are needed to do the time-consuming reconciliation of bills for service, to keep track of the terms of maintenance agreements and to model various options.

Software. Although most installations use packaged systems software, they still do an inordinate amount of their own applications development work.

While direct costs are relatively easy to estimate, indirect costs are more difficult to assess, as the following questions illustrate:

- To what extent does development impact production work on the computer?
- What proportion of the hardware costs are allocated to nonproductive development?
- What percentage of the development resource is allocated to maintenance?
- To what extent does production software that has not been kept current with the hardware impact the performance of the computer?
- How is productivity reduced through production reruns, and are systems crashes due to inadequately tested or designed in-house software?
- How is maintenance impacted by badly designed or documented software?
- How is productivity of in-house development impacted by the salary levels paid, quality and quantity of staff and rate of turnover?

Computer Supplies/Environment. To determine its actual profitability, the DP center should be set up as a profit/cost center and charged for environmental overhead.

The DP manager should have access to a comprehensive job accounting/performance measurement product that monitors productivity over shift, day, week, month or any desired period.

Some packages collect data on overall system utilization and performance to help determine the effectiveness of the system's hardware and software configuration for the present work load and project trends for future periods.

This information can be used to project future costs, eliminate inefficiencies and provide justification for acquiring or discontinuing equipment or software.

Some products can actually optimize code, identify hidden and untested logic errors and provide debugging information.

Others include debuggers that shorten the testing and debugging cycle and produce more reliable programs.

Then there are powerful information processing tools with unlimited file-handling capabilities. They can generate an unlimited number of reports with a single pass of the input file and reduce report generation times by nearly 80%.

Project management products can help data center managers stay on budget by deploying the proper mix of programming resources to meet project deadlines.

In this way, the DP center is not just providing automation at a reduced cost.

The professional management of the DP center and its contribution to the company are more clearly demonstrated.

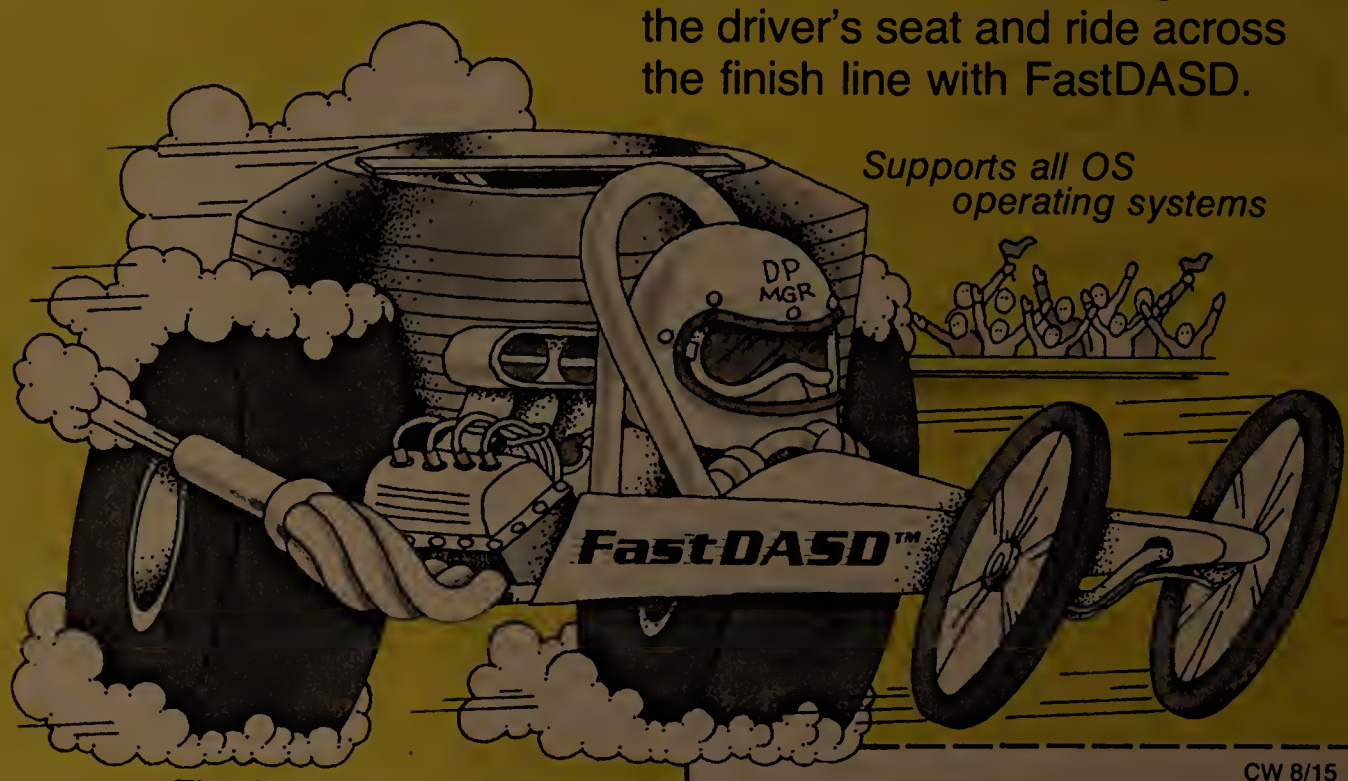
Wang is president of Computer Associates International, Inc.

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For Distribution Plans

'Logic' Finds Lowest Cost

TORONTO — A distribution logistics optimization software program for finding lowest cost physical distribution plans is now available from Numetrix Ltd.

The new program, Logic, is part of Numetrix' integrated decision support system, Result. Numetrix said the program enables managers and planners to evaluate, using a screen terminal or IBM Personal Computer linked to a mainframe, various strategic distribution alternatives or automatically select an optimum distribution policy based on geographic supply and demand and related transportation costs. It is applicable to fleet composition studies, location selection, distribution network planning and distribution problems.

A part of the Result integrated decision support system developed by Numetrix, Logic may be accessed through the Numetrix Time-Sharing Service at standard rates and is available in bundled mode with Result for in-house installation on IBM, Digital Equipment Corp. and other mainframe computers for a monthly license fee of $1,125. Numetrix is located at 5th Floor, 3 Church St., Toronto, Ontario M5E 1M2.

PE's 'Debug/32' Tests, Verifies Fortran VII

OCEANPORT, N.J. — Perkin-Elmer Corp. has introduced a symbolic debugger that is said to allow a programmer interactively to test and verify the operation of application programs using the Fortran language.

Debug/32 provides full source-level debugging of Fortran VII programs using the same variables, labels and other constructs of the original Fortran source, the vendor said. In addition, the debugger interpretively executes Fortran VII assignments and IF and CALL statements providing full Fortran syntax and semantics, according to the vendor.

This product is priced separately at $2,000. It is also available with the company's Universal Fortran language system ($15,000) and the Global Fortran language system ($10,300). PE can be reached at 2 Crescent Place, Oceanport, N.J. 07757.

ATI Releases Training Kit For Dbase II

MANHATTAN BEACH, Calif. — American Training International, Inc. (ATI) has released training software for Ashton-Tate's Dbase II and BPI Systems, Inc.'s General Accounting software for personal computers.

The training packages use interactive disks that simulate the software and lead the user step by step in the use of the software.

Volume 1 of the training software for Dbase II instructs the user in how to set up a data base file, according to the vendor.

Volume 2 of Dbase II deals with the program that acts on the data base file, specifically: menu, data entry, printing customized forms, generating reports of indexed information and printing mailing labels, according to the vendor.

Each volume is available separately for $39.95 each, or both for $75.

The training software for BPI General Accounting is designed to teach users how to master a program to help small businesses manage their financial information. The package costs $75.

American Training International can be reached at Suite 201, 3770 Highland Ave., Manhattan Beach, Calif. 90266.

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For Engineering Analysis

Scada Program Supports DEC Systems

LOS ANGELES — American Computers & Engineers has introduced an engineering analysis program for users of Digital Equipment Corp.'s Rainbow, PC-350, VAX-11 and PDP-11 computers.

The Structural Computer-Aided Design and Analysis (Scada) program will reportedly analyze any size structure, including shear walls and slabs. It plots structures in high resolution with or without deflection, the vendor said. The product reportedly can carry model analysis, time history, response spectrum, base motion analysis and design concrete or steel beams and columns.

Written in Fortran, Scada is designed to run under Digital Research, Inc.'s CP/M operating system, and under DEC's VMS, RSX-11M and P/OS operating systems.

The package lists for $9,100, the vendor said from Suite 204, 2001 S. Barrington Ave., Los Angeles, Calif. 90025.

Accounting Package Fits Series 1

PALO ALTO, Calif. — Remote Computing Corp. has announced an accounts payable package for the IBM Series/1 computer under Pick & Associates, Inc.'s Pick operating system.

Features include on-line storage of invoices and checks, automatic payment of recurring bills and contracts as due, automatic account and cost center distributions and custom management reports.

The package reportedly can be fully integrated with financial systems from Priority Plus Corp., including general ledger, scheduled amortizations, construction loan control, loan origination and tracking and personnel management.

The accounts payable system costs $4,000 from Remote Computing at 1076 E. Meadow Circle, Palo Alto, Calif. 94303.

RTfile DBMS Available for VAX-11

BETHESDA, Md. — Contel Information Systems, Inc. has announced that its RTfile data base management system (DBMS) is now available under the VMS operating system for all of Digital Equipment Corp.'s VAX-11 minicomputers.

RTfile is an interactive fourth-generation relational DBMS for users of DEC's LSI-11, PDP-11 and VAX computer systems. The system provides menu-driven, forms-oriented utilities which enable end users to perform a wide range of commonly needed DP tasks without programming.

Depending on options, RTfile costs between $4,500 and $9,500 from Contel at 4330 East-West Highway, Bethesda, Md. 20814.

Accounting System Tailored to VAX-11

SAN ANTONIO, Texas — Plycom Services, Inc. has an Accounts Payable System designed to work on any Digital Equipment Corp. VAX-11 computer running the VMS operating system.

Features are said to include menus, batch entry of invoices, on-line maintenance of transactions and master files, accounting period orientation and automated period and year-end closing procedures.

Designed to handle a multidivision or multicompany corporate structure, the software features a query program and several informational reports. It automatically produces expense and disbursement entries for the general ledger.

Written in VAX Basic, the software is priced from $7,500, according to Plycom Services at Suite 150, 4243 Piedras E., San Antonio, Texas 78228.

'Adli' Backs File Conversion

FORT WAYNE, Ind. — Conversion Systems, Inc. (CSI) has announced Adli, a product which allows NCR-Comten, Inc. Amigos files to be converted either to Vsam or IBM DL/1 files without affecting application programs.

The product is designed to ease the task of converting to a new data base management system or teleprocessing monitor, a spokesman said.

Adli does not require any source code conversion or recompilation of existing applications. The interface software does not restrict the user's application language, file structure or data format.

The operation of Adli is transparent to the user and the application programs. Once Adli is installed, IBM's IMS can be used immediately without the need to change applications. Conversion can take place as part of the normal program maintenance cycle, the vendor said.

Adli costs $20,000 for OS and $25,000 for DOS operating systems from CSI, 3442 Stellhorn Road, Fort Wayne, Ind. 46815.

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GENERAL ELECTRIC

For Honeywell's DPS 6

Fixed Assets Package Offered

PHOENIX — A fixed assets software package for the Honeywell, Inc. Level 6/DPS 6 minicomputer has been introduced by Independent Computer Systems, Inc.

The fixed assets package is said to provide for all generally accepted depreciation methods and to maintain depreciation on a tax and book basis. The system is on-line, menu-driven and designed to be used by non-DPers, according to a spokesman for the vendor. It features 14 depreciation methods, asset transfers and retirements, depreciation forecasting and method change analysis, the spokesman said.

The software requires Honeywell's Gcos MOD400 operating system, Vdam and 40K bytes of memory per terminal.

A one-time license fee is $16,000 from Independent Computer Systems at 8686 N. Central, Phoenix, Ariz. 85020.

MCBA Unveils 'G/L' Release In Cobol for Wang VS Line

MONTROSE, Calif. — Mini-Computer Business Applications, Inc. (MCBA) has announced a release of its General Ledger (G/L) package written in Cobol for the Wang Laboratories, Inc. VS family of computers.

Release 3 is said to feature multi-company capabilities and an expanded user-defined G/L account number allowing as many as 21 characters in up to five levels. The release allows the user to define interactively financial entities, grouping up to 36 ranges of profit and cost centers into each financial entity, according to a spokesman for the vendor.

The release costs $2,000 to $6,000 for source code for the first computer, depending on VS model. MCBA is headquartered at 2441 Honolulu Ave., Montrose, Calif. 91020.

DEC VAX Users Get 'CJ/Payroll'

TAMPA, Fla. — Collier-Jackson, Inc.'s payroll processing and reporting package is now available on Digital Equipment Corp.'s VAX-11 family of 32-bit minicomputers.

CJ/Payroll is a data-base-oriented, on-line, menu-driven software package said to provide automatic processing from time transactions through general ledger updating.

The software accommodates multiple companies, divisions and departments as well as single entities. System customization is achieved through master files, data tables and logic controls.

A $16,000 license fee includes object code, source code, training at the user's facility, installation, documentation and 90-day support. Collier-Jackson is headquartered at 5406 Hoover Blvd., Tampa, Fla. 33614.

'Update' Added To Data Base On Remote Net

EL SEGUNDO, Calif. — Computer Sciences Corp. (CSC) has added a load and update processor to the Manage data base system available on its Infonet remote computing network.

Called Update, the new package allows an Infonet customer to use English-like commands to load or change single or multiple records and values throughout a complex data base structure, the company claimed. Users previously had to load and update their data bases with Fortran or Cobol programs written for that purpose.

Update's language is modeled after the Manage inquiry and report writing language, a spokesman said. No special charges are associated with the use of Manage or Update. Costs are determined by Infonet resources used.

CSC is located at 650 N. Sepulveda Blvd., El Segundo, Calif. 90245.

'EZM' Processor, Plotting Package Out for 'Domain'

WELLESLEY, Mass. — DLB Computer Systems, Inc. has introduced an integrated business/financial time-series processor and graphics program with mainframe capabilities for Apollo Computer, Inc.'s Domain system.

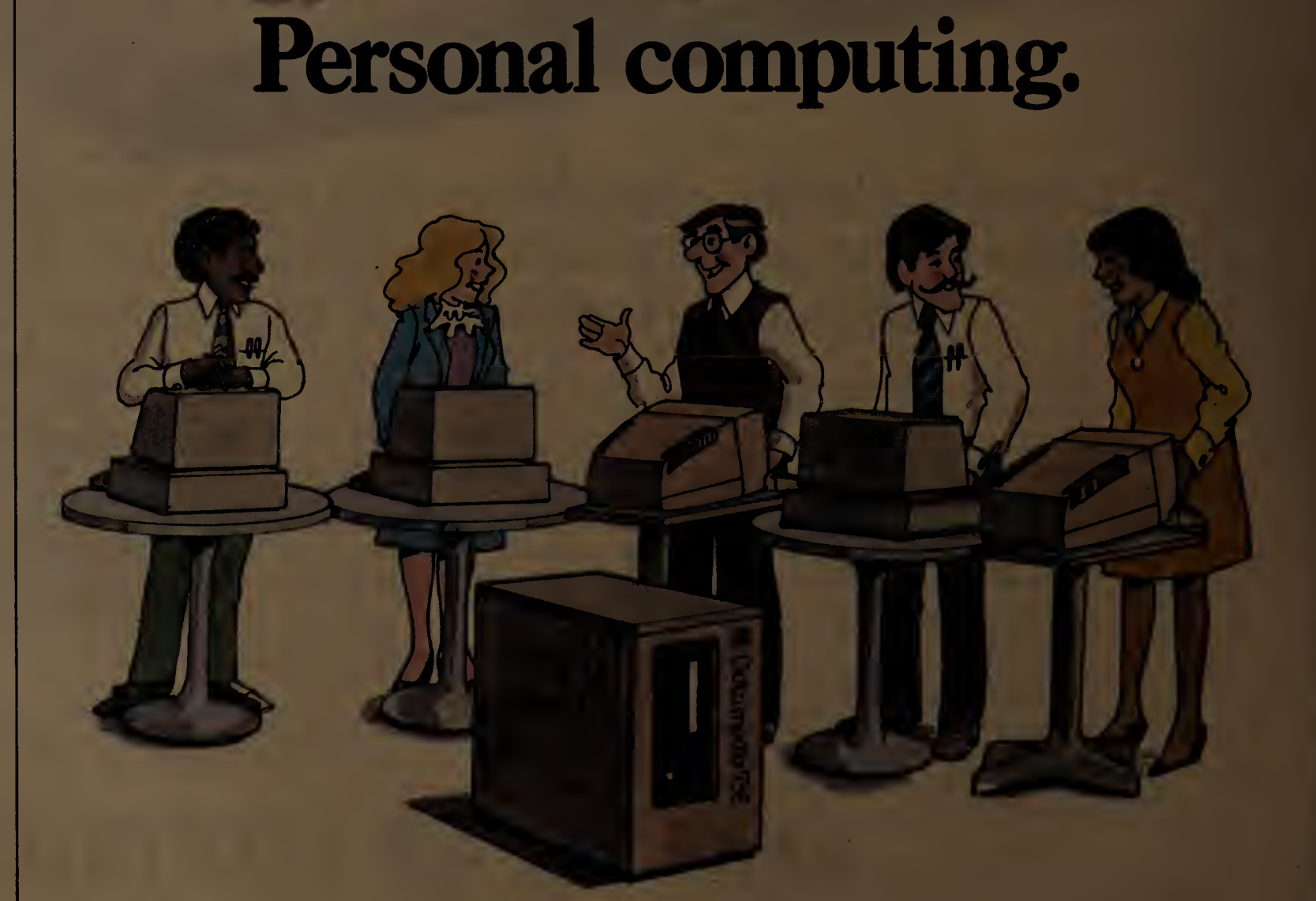
Easymodeler (EZM), with over 20,000 lines of source code, is said to allow the manipulation of such data as corporate financial statistics, securities market price and volume data, production statistics and government indexes, a vendor spokesman said.

Integrated with EZM is a plotting package that produces graphs of projected data. The package can be configured to access user data bases created with Apollo's D3M Domain Distributed Data Base Management System.

EZM costs $2,500 per Domain node, DLB said from 1 Hollis St., Wellesley, Mass. 02181.



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DEC Minis Get MS-DOS

BERKELEY, Calif. — Virtual Microsystems has introduced Microsoft, Inc. MS-DOS operating system capability to users of Digital Equipment Corp. minicomputers.

The MS-DOS Bridge System is an integrated hardware/software 16-bit virtual microcomputer that offers centralized microcomputing capability when used with DEC's Unibus machines, according to the vendor. Any terminal or processor attached to the minicomputer can reportedly run jobs in the host environment, which will functionally attach that user to a 16-bit personal computer. Instead of using floppy disks, the user of the virtual machine specifies virtual floppies to be attached for the current work session.

The MS-DOS Bridge System is priced at $6,500 from Virtual Microsystems at Suite 720, 2150 Shattuck Ave., Berkeley, Calif. 94704.

Wang VS-Compatible Software Package Controls Inventory for Oil Companies

CORAL GABLES, Fla. — Business Computer Solutions, Inc. has introduced a Wang Laboratories, Inc. VS-compatible business management system software package for oil companies.

Oil Company Inventory Control Log is said to be a menu-driven, user-friendly set of seven systems: inventory control, accounts payable, accounts receivable, order entry, general ledger, payroll and fixed asset accounting. The first four modules listed are designed according to Federal Accounting Standards Board recommendations.

Prices start at $20,000, depending on hardware, extent of networking and what is supported. Business Computer Solutions is located at 2655 LeJeune Road, Coral Gables, Fla. 33134.

Graphics Package Fits DEC

MINNEAPOLIS, Minn. — Saturn Systems, Inc. has announced Saturn-Graph, a business graphics software package for users of Digital Equipment Corp. RT-11/TSX, RSX, RSTS and VMS operating systems.

The package can be used as either an add-on to the firm's Saturn-Calc package or as a stand-alone package. It allows the user to create bar graphs, line graphs or pie charts. As a stand-alone package, Saturn-Graph can produce a variety of type styles as well as other graph types, including histograms and three-dimensional charts, the vendor said.

The Saturn-Graph package costs $489 for the add-on version and $978 for the stand-alone package. Saturn Systems is located at No. 218, 6875 Washington Ave. S., Minneapolis, Minn. 55435.

Control System For Micros Boasts 40 Modules

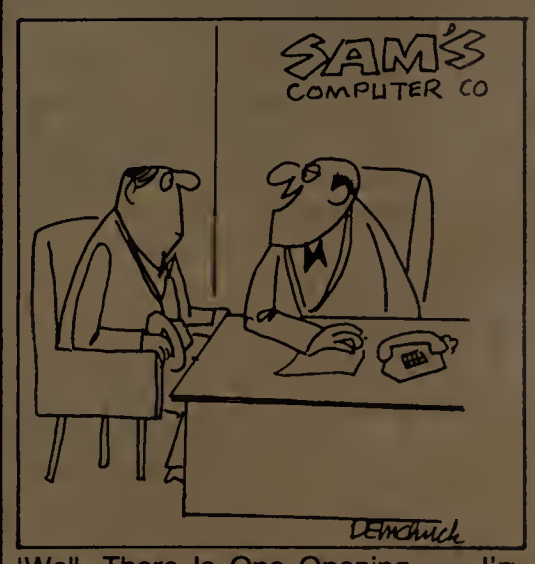
STAMFORD, Conn. — Synergistic Systems, Inc. has announced the availability of its Manufacturing Inventory Control System which reportedly runs on small business systems and microcomputers that support Ryan-McFarland, Inc. Cobol.

The package is said to be a collection of more than 40 functional and report modules including multilevel bills of material explosion, implosion and "what if" processing for Nohalt, Wicat Systems, Inc., Altos Computer Systems, Inc., Northstar Computer, Inc. and Molecular Logic Corp. equipment.

The system reportedly is menu-driven with data entry checking. It creates and maintains data and status information for the inventory, open and closed jobs, shortages and a detailed transaction history for audit purposes. For each part, the last six prices are retained and options for Lifo, Fifo and average accounting methods are supported.

The Cobol-80 version runs in 64K bytes under Digital Research, Inc.'s CP/M, while the multiuser version, written in Ryan-McFarland Cobol, utilizes multiple-key files for sorting versatility and record lock-out to protect data in a multiuser environment. Both versions require a hard disk (1M-byte program space) and are available only on a "semicustomized" basis.

The basic cost for either version is $2,000 plus changes and additions, a spokesman said. Synergistic Systems is located at 870 High Ridge Road, Stamford, Conn. 06905.



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Retail Solutions, Inc. has announced a multiuser, multitasking operating system for the IBM Personal Computer and Personal Computer XT. Called the **Personal Computer/Multiuser Operating System (PC/MOS)** the system was developed for use with the company's The Retailer point-of-sale, inventory control and business accounting system for retail stores. PC/MOS can support up to 16 partitions. It costs $300 from 1211 Alderwood Ave., Sunnyvale, Calif. 94086.

General Electric Information Services Co. (Geisco) has announced an agreement with Execuware, a division of Aeronca, Inc. to allow users of Geisco's Mark III teleprocessing service to obtain electronically a demonstration of Execuware software for use on their own system. An Execuclub membership costs $60 for an individual or $600 for a corporation with up to 50 users supported.

The following Execuware packages are available to Execuclub members at a 20% discount off the indicated retail price: **The Next Step**, which generates business reports and programs, $345; **Know Your Client**, which allows organization and retrieval of information on up to 400 clients, $92.95; **Real Estate Analysis Package**, which performs analysis on financial parameters concerning acquisition of property, $149.95; **Financial Analysis Package**, $92.95; and **Economic Order Quantity**, to calculate total cost and discover loss of capital by indicating when inventory levels are kept too high, $92.95.

Sextant Systems, Inc. has announced two packages for the IBM Personal Computer and Personal Computer-compatible systems running under IBM's PC-DOS, Microsoft, Inc.'s MS-DOS or Digital Research, Inc.'s CP/M 86. **Microcrypt** provides security features including file encryption, file decryption, encrypted file viewing, file encryption for data transmission and file decryption for data transmission. It costs $95.

Quill is a document preparation system which includes document sectioning, automatic table of contents, bibliographies, footnote referencing and document indexing. It sells for $249. Sextant can be contacted through P.O. Box 251, Holmdel, N.J. 07733.

Microtek, Inc. has announced two sets of utility programs for the IBM Personal Computer with a minimum of 64K bytes of memory. **Master Utilities Volume No. 1** includes the Masterspooler print spooler; Masterspooler II, which is designed to drive the parallel port of the Personal Computer; and Masterdisk, a disk emulation program. The volume retails for $49.95.

Master Utilities Volume No. 2 includes 10 program utilities: Masterdirsort for DOS directory sorting; Masterdump for graphics screen dump routines; Masterenlarge for user-defined large screen print fonts; Masterkey for redefining DOS function keys; Masterlabel for printing formats for diskette labels; Mastermenu to sort/list Basic file menus with function keys; Masterpack to compress Basic programs; Masterundelete for recovery of erased files; Masteredit, a full-screen editor; and Masterformat for formatting edited material. The full volume sells for $99.95. Both volumes are available from 4750 Viewridge Ave., San Diego, Calif. 92123.

Softech Microsystems, Inc. has announced a utility package that allows users of the University of California at San Diego's P-System operating system to access the IBM Personal Computer XT 10M-byte fixed disk and to install drives for non-IBM standard peripherals. The package costs $20 from 16885 W. Bernardo Drive, San Diego, Calif. 92127.

The Information People has announced **Organizer II - Universal Operator Interface** for microcomputers running Digital Research, Inc.'s CP/M and MP/M, IBM's PC-DOS and Microsoft, Inc.'s MS-DOS operating systems. The package is said to provide an easily understood interface between the user and various kinds of operating systems. The package retails for $149 from 443 Hudson Ave., Newark, Ohio 43055.

Hayden Software Co. has announced an **Object Relocatable Assembler for Micros (Orca/M)**, a macro assembler which is modeled on the IBM 370 macro assembler. The product features its own IBM DOS 3.3-compatible operating system, co-resident screen editor, relocatable code generator and a link editor. Orca/M costs $99.95 from 600 Suffolk St., Lowell, Mass. 01853.

Redding Group, Inc. has announced a version of its **Graftalk** graphics product for the IBM Personal Computer with Microsoft, Inc.'s MS-DOS operating system and Hewlett-Packard Co.'s 7470 plotter. Graftalk uses English-like commands to produce bar, pie, line and symbol charts, a spokesman said. The package costs $450 from 609 Main St., Ridgefield, Conn. 06877.

(Continued on Page 64)

SCIENCE/SCOPE

A Very High Speed Integrated Circuit chip has been produced at Hughes Aircraft Company, marking a significant step toward using advanced semiconductor technology in military systems. The chip, built after less than two years of development, contains 72,000 transistors in an area the size of a thumb tack. The VHSIC program is being conducted by the U.S. Department of Defense to develop chips that will give military electronic systems a tenfold increase in signal processing capability. The high-speed, compact VHSIC chips will be more reliable and will require less power than integrated circuits now in use.

A new video graphics projector that's brighter and sharper than conventional projection TV may be the next addition to office computer systems. The Hughes projector displays monochromatic computer-generated alphanumerics, symbols, and graphics. It could be used for displaying dynamic computer data and facsimile video pictures in board rooms and other areas, and for teleconferencing. The projector uses a device called a liquid-crystal light valve, a cousin of displays in digital watches. This device intensifies the image from a cathode-ray tube and projects it onto a screen up to 12 feet wide. The picture is so bright and has such high resolution that the viewing room needn't be darkened.

A uniquely shaped waveguide antenna is one of 13 patentable innovations built into the Advanced Medium-Range Air-to-Air Missile. The antenna is configured to occupy a very small space and yet provide a low-frequency-band data link to launching aircraft. Its novel shape also minimizes interference and provides a moderate amount of cross-polarization, a feature that improves communications. Hughes designed and developed AMRAAM for the U.S. Air Force and Navy.

The U.S. Navy's A-6E Intruder aircraft will carry an improved turret for its electro-optical system, which lets the aircrew see and attack surface targets shrouded by darkness, smoke, or haze. The turret, located on the aircraft's chin, is part of a combination laser and infrared device, the Hughes Detecting and Ranging Set. While the original turret allows access from the bottom, the new clamshell-like design allows quick access from both top and bottom to simplify maintenance. The design also reduces the length of flat cable in the turret by 35 feet. The new turret will be introduced in December.

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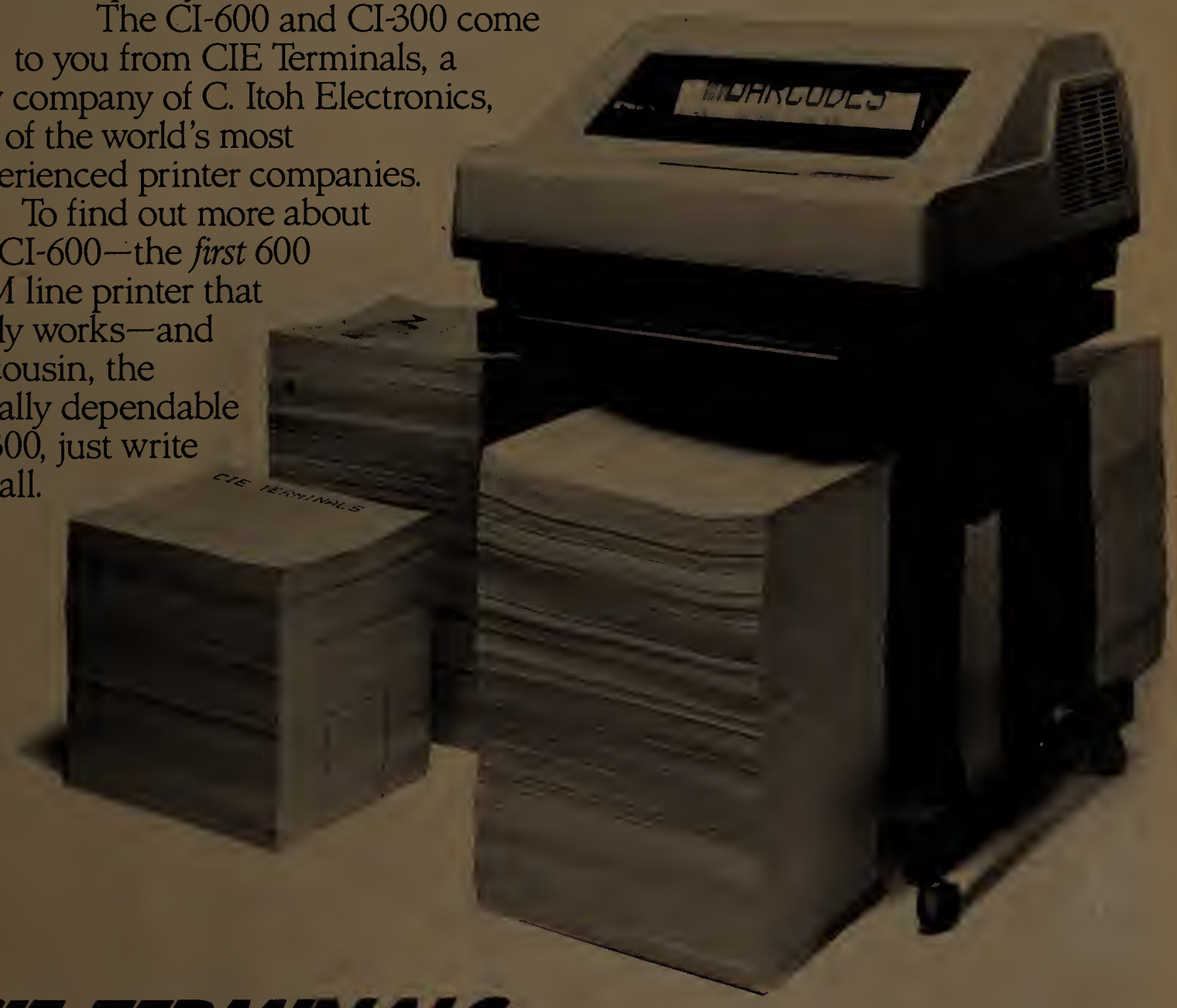
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Micronotes

(Continued from Page 62)

Fisher Business Systems, Inc. has announced the **Personnel Agency Management System** for personnel agencies using the IBM Personal Computer XT and other personal computers using Microsoft, Inc.'s MS-DOS, priced at $1,500. Contact the vendor at Suite A-200, 3260 Powers Ferry Road, Atlanta, Ga. 30067.

Zenith Data Systems Corp. has released a directory listing more than 230 16-bit software programs for its Z-100 desktop computer. The directory is available for $25 from Zenith at 1000 Milwaukee Ave., Glenview, Ill. 60025.

Dynamic Microprocessor Associates, Inc. has announced **OS Converter**, a package which permits Microsoft, Inc. MS-DOS object code to run on Digital Research, Inc. CP/M 86 microcomputers and enables CP/M 86 object code to run on MS-DOS systems, reportedly without loss of speed. The product costs $95 for either operating system from 545 Fifth Ave., New York, N.Y. 10017.

VM Personal Computing, Inc. has introduced **Relay**, a communications software package for the IBM Personal Computer that allows users access to a variety of computer service bureaus and communication and data transfer to corporate mainframes. It is available for $89 from the vendor at 60 E. 42nd St., New York, N.Y. 10165.

The Business User's Solution, a set of integrated applications modules, is available from Executec Corp. for use under its Execu/Bus environmental control program. Package modules include word processing, graphics spreadsheet, communications, data management and reporter applications for the IBM Personal Computer and other personal computers. Prices range from $450, and Executec also announced distribution through Starsoft, Inc. Queries to Executec should be addressed to 12200 Park Central Drive, Dallas, Texas 75251.

Bailey and Associates, Software Publishing and Marketing Division, has introduced **DBmenu**, a menu program designed to eliminate the need for users to write and rewrite menu programs when using Ashton-Tate, Inc.'s DBase II on microcomputers running under Digital Research, Inc.'s CP/M or Musys Corp.'s Turbodos systems and the IBM Personal Computer with PC-DOS. It is available for $19.95 plus $2 shipping from the vendor at 3747 S. Harvard, Tulsa, Okla. 74135.

Intel Corp. has published the first annual **Software Yellow Pages**, a directory listing more than 2,000 of its own and independent vendors' software packages for Intel's IAPX family of microprocessors. It can be ordered free of charge by writing on business letterhead only to the vendor at Literature Department Z15, 3065 Bowers Ave., Santa Clara, Calif. 95051.

The **File Utilization Analysis System**, a software product designed to provide a nontechnical method of monitoring disk file usage and availability on the IBM System/34 minicomputer, is available for a one-time fee of $79.95 from Applied Data Processing, Inc., 10939 N.E. 49th St., Kirkland, Wash. 98033.

Data Base Manager II, a data base program for the IBM Personal Computer, has been introduced by Alpha Software Corp. and is said to integrate popular spreadsheet and word processing programs. The package is priced at $295 in retail outlets, and further information is available from the vendor at 6 New England Executive Park, Burlington, Mass. 01803.

The Software Express, Inc. has introduced Appgen, an automated applications generation tool, along with an array of Appgen applications packages that run under Unix and Pick and Associates, Inc.'s Pick operating systems. Appgen is priced at $12,000 and applications packages start at $1,200. Information is available from the vendor at Suite 220, 10103 Fondren, Houston, Texas 77096.

OPS-80, emulating Digital Equipment Corp.'s Decsystem 10's Tops-10 monitor, is available from Aquinas Computers Corp. through various retail and distribution outlets. OPS-80 was designed for a distributed processing network and reportedly allows each workstation to be a host, master/slave, file server and print server. Suggested retail price is $250 and further information is available from the vendor through P.O. Box 384, Monterey Park, Calif. 91745.

'Graphmaster 23' Builds Graphs

CHARLESTON, W. Va. — Computer Consulting Corp. has announced a software product capable of producing bar graphs for the IBM System 23 Datamaster.

The product, called Graphmaster/23, is said to be completely menu-driven, and uses a screen prompting approach to guide the user through defining, generating, storing and printing bar graphs.

The Graphmaster/23 also retains the last generated image for every bar graph and makes it available to the user at any time for both displaying on the CRT and/or printing on the system printer, the vendor said.

The system, including help screens, on-line documentation, a manual and sample bar graphs, costs $495 for the diskette version and

Computer Consulting Corp. can be reached through P.O. Box 4407, 322 70th St. S.E., Charleston, W. Va. 25304.



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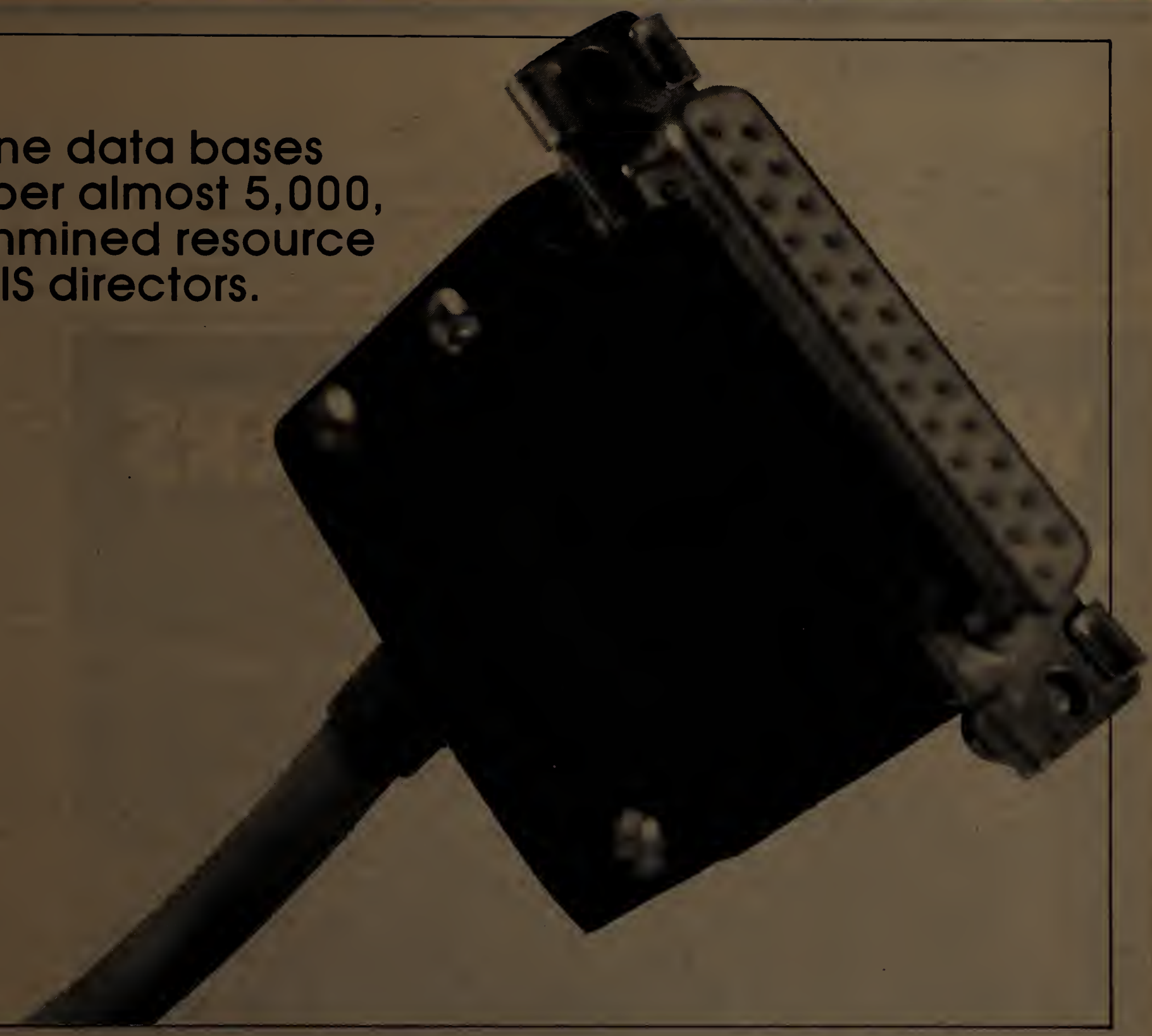
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On-line data bases number almost 5,000, an unmined resource for MIS directors.



Tapping External Data Sources

By Forest Woody Horton Jr.

Most MIS directors are so busy trying to keep up with enhancements and coping with backlogs of internal company information systems and services, they scarcely have time to discover what the newer external information resources offer.

In fact, outside resources in machine-manipulable formats and processing modes will transform the basic modus operandi of many MIS organizations over the next few years.

While hardware and software will continue to advance dramatically, the real megaindustry of the late '80s and beyond will be that sector of the broad electronic marketplace that adds value to raw data products and services. Companies in this "information industry" make data more readily accessible, understandable, usable, communicable and "intelligent." These companies do not focus on the carrier but concentrate on the content of the message itself.

This industry is redesigning and rebuilding the most complex, imaginative and productive communications/information apparatus possible with today's technologies.

Within this marketplace, many economic forces compete — the telephone companies, broadcasting systems, news media, cable companies, and satellite systems. The activities of these competitors come together in one common denominator: information content.

Among the broad classes of enterprises represented in this sector of the marketplace are the following:

Producers that acquire, edit and process information and deliver it as books, electronically accessible data bases, journals, microform collections and so forth.

Distributors that provide value-added information based on their own data bases or those of others, along with delivery services that include on-line, videotex, teletext and so forth.

Retailers that offer expert, customized access to information, whether in traditional or electronic forms.

Managers that operate clearinghouses or management information services.

Processors that provide capabilities in computer processing and communications to facilitate delivery of private and public data and information sources to users.

IN DEPTH

The proliferation of on-line publishers, products and services is dramatic. Give yourself, your colleagues or your boss a quiz.

Can you describe the products and services in the following list and name the supplier? (The answers appear in the box on In Depth/7.)

1. Dialog Information Service.
2. ABI/Inform.
3. Legi-Slate.
4. Nexis.
5. BRS/Search.
6. Dunsprint.
7. Innerline.
8. Patsearch.
9. Orbit Search Service.
10. Viewtron.
11. Compustat.
12. Psycinfo.
13. The Source.
14. Laborlaw.
15. OAG Electronic Edition.
16. Management Contents.
17. Newsnet.
18. Scisearch.
19. Magazine Index.
20. American Statistics Index.
21. X/Market.
22. Dow Jones News/Retrieval.
23. Disclosure II.
24. BI/Data.

What do companies in the information industry do? Here is a sampling:

The Dun & Bradstreet Corp. (Parsippany, N.J.) produces Duns Dial, a toll-free service to call for up-to-date Dun & Bradstreet business information, and Dunsprint, involving several report formats transmitted via high-speed customer print terminals.

Dow Jones & Co., Inc. (Princeton, N.J.) produces Dow Jones Software, a series of three investment analysis products available through retailers, designed for business and professional investors. The software allows access and manipulation of data from Dow Jones News/Retrieval.

Information Clearing House, Inc.'s (New York, N.Y.) Find/SVP Quick Information Service provides direct telephone access to an information center for quick answers to a variety of business and general questions. The service includes access to a worldwide network of SVP information centers.

Gale Research Co. (Detroit, Mich.), publisher of a large number of diversified general-purpose guides and directories, makes several of these products available as on-line data bases through Dialog Information Services, Inc. (one of the largest on-line services in the world). Gale's commercially available data bases include the



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Biography Master Index, Book Review Index, Encyclopedia of Associations and Research Centers Directory.

Informatics General Corp. (Dallas, Texas) responds to the information management needs of clients through such systems as its Life-Comm, used in dozens of insurance companies.

International Data Corp. (Framingham, Mass.) is a market research, consulting and publishing firm that offers Data Files providing listings of worldwide computer installations; identifying multiple-unit buyers of micro- and minicomputer equipment and peripheral devices; and profiling services and software vendors and markets. IDC also publishes a series of industry newsletters in the computer/telecommunications field.

The American Psychological Association's Psycinfo (Washington, D.C.) is a source of behavioral information for the social sciences, business, law, medicine and related fields and produces such product lines as Psycinfo Database, which is available on-line through Bibliographic Retrieval Service, Data-Star, Dialog, Dimdi (in Germany) and System Development Corp.; and Psycinfo Assisted Search and Retrieval (Pasar), which permits retrospective searching and retrieval.

Times Mirror Videotex Services, Inc. (Costa Mesa, Calif.) has been heavily engaged in field trials delivering videotex service to 350 Southern California households via telephone and two-way cable. Known as Gateway, the service includes applications such as home banking, home shopping and ordering, news, games, educational programs, classified ads, electronic mail and personal calendars.

'Traditionally, MIS departments have been primarily concerned with creating internal data bases and information systems to support the large number-crunching applications such as inventory control, personnel, payroll and financial accounting.'

Information Consultants, Inc. (Washington, D.C.) offers Catalyst, a multiresource service to help subscribers design, build and maintain on-line, highly customized data bases of public or private files using menu-driven search techniques, built-in HELP messages and search commands tailored to existing vocabularies.

In the largest Fortune 1000 companies, a relatively small fraction of these kinds of information products and services is accessed. Companies are not even aware they exist.

(Continued on In Depth/8)

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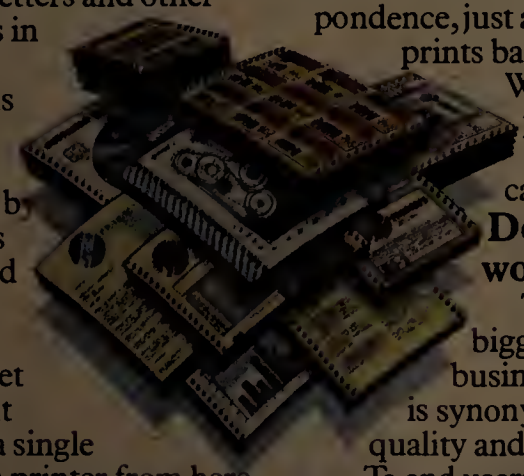
And if that business also uses bar codes and labels, it needs a printer with a brain.

The brain is built in.

Instructing the printer how to make codes can take a lot of input time from the host computer–time that it can't be used for other jobs.

Dataproducts' M-100L matrix printer has its own label-printing control board built in. It's preprogrammed to produce bar codes, block letters and other label graphics in a variety of configurations and sizes.

The board was designed by Dataproducts and is installed at the Dataproducts factory. So you get this intelligent printer from a single supplier, not a printer from here and a control board from there.



From accounting to shipping, everyone's in on this printer's act.

After the day's labels are printed, the M-100L is just getting started.

It prints reports, invoices, checks, sales charts, forms and even a lot of office correspondence, just as well as it prints bar codes and labels.

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Depend on the world leader.

To some of the biggest OEMs in the business, Dataproducts is synonymous with quality and reliability.

To end users, Dataproducts means high productivity, low cost of ownership. We're the world's largest independent manufacturer of computer printers. We build the M-100L to the same stringent standards we set for all our printers, including our most sophisticated high-speed printers. And we warrant it to OEMs a full two years—the printhead itself for one. To learn more, phone (213) 887-3924 or send the coupon below.



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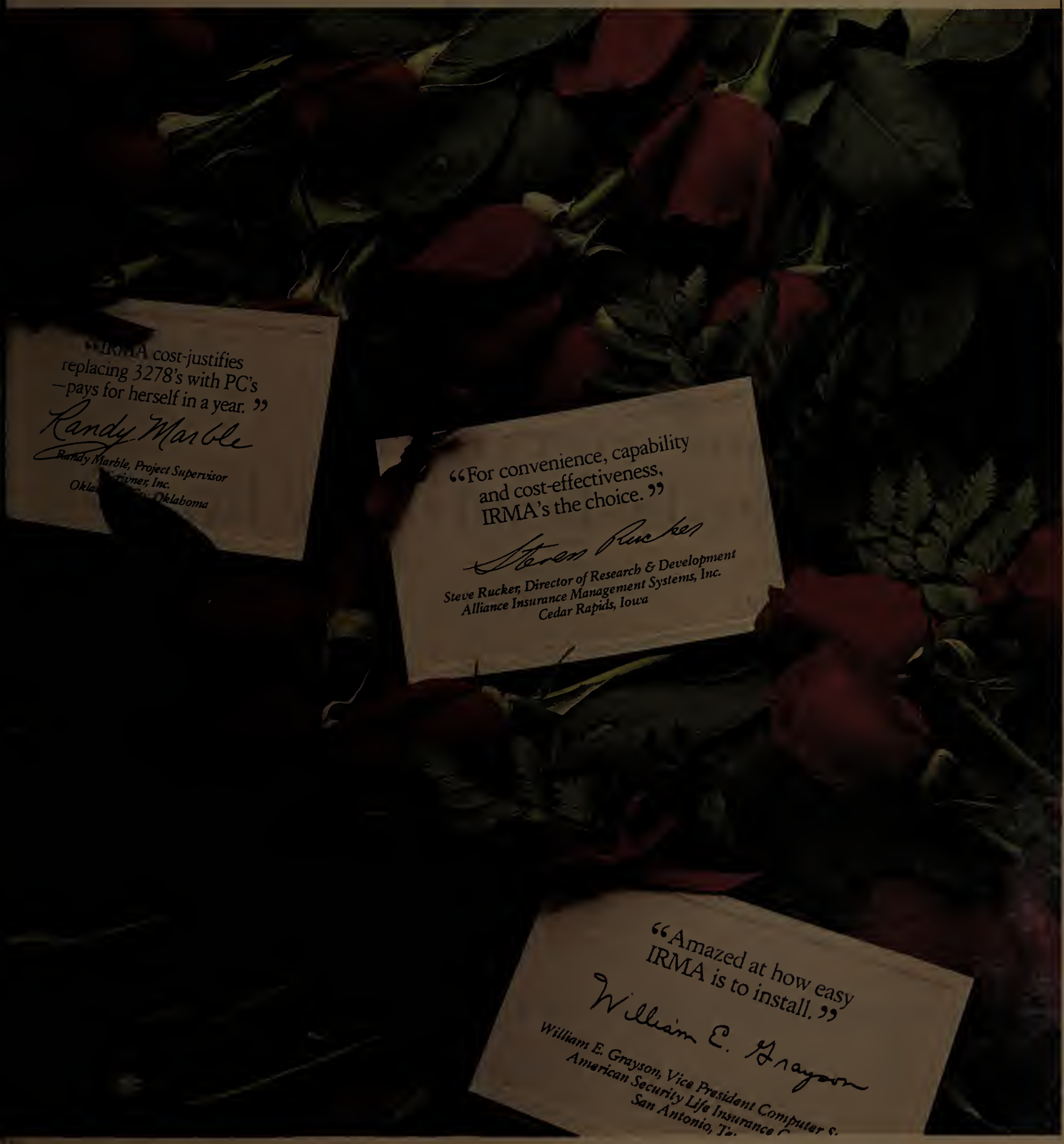
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Management Science of America, Inc. (MSA)
Atlanta, Georgia

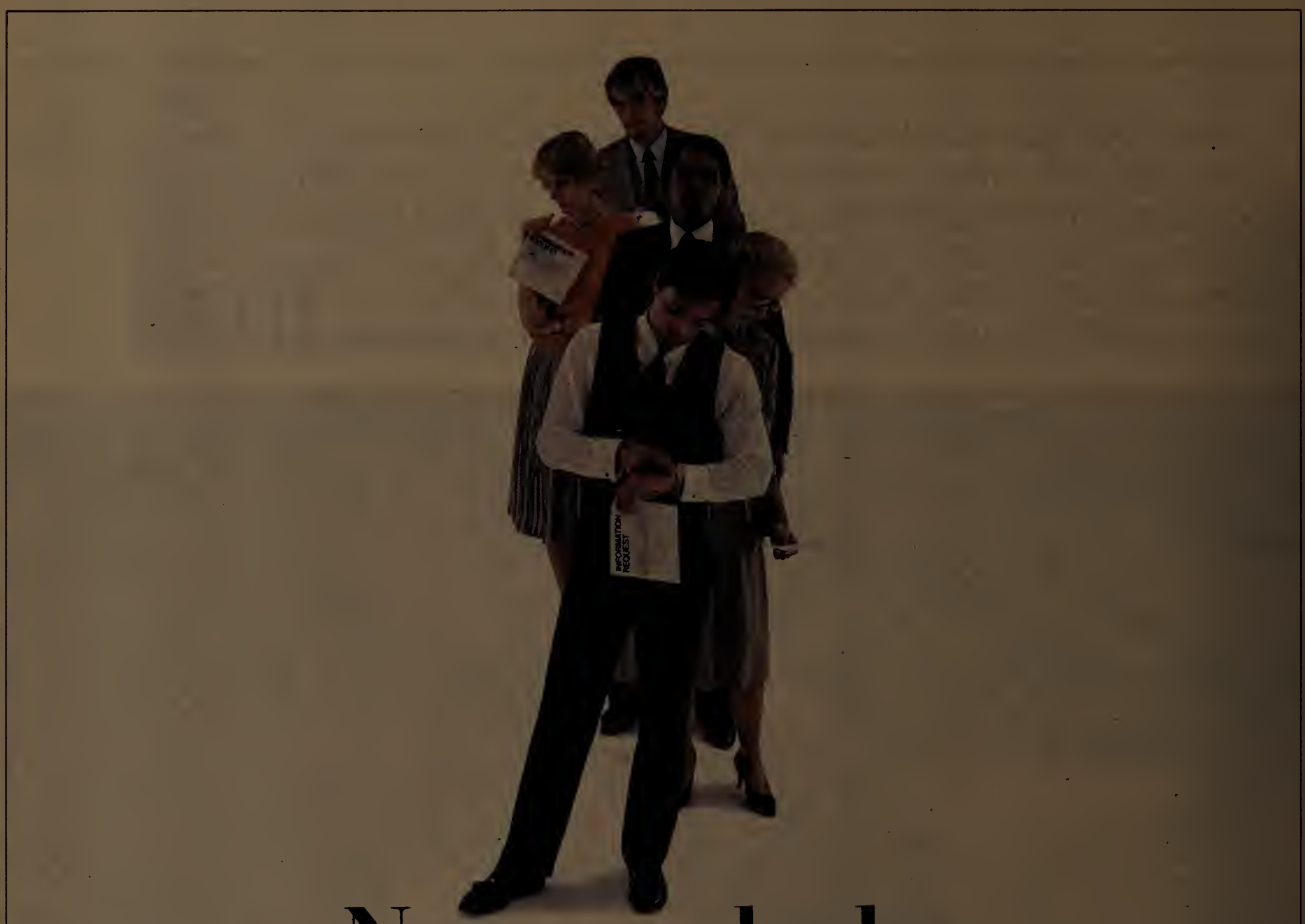
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George Pruett, Analyst
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A Sampling of Products and Services

PRODUCING COMPANY	PRODUCT OR SERVICE	PRODUCT OR SERVICE DESCRIPTION[1]	FREQUENCY OF UPDATE[2]
1. Dialog Information Services, Inc. Palo Alto, Calif.	Dialog	On-line access to 170 data bases from many sources on a wide variety of subjects	Varies with each data base
2. Data Courier, Inc. Louisville, Ky.	ABI/Inform	On-line access to citations and abstracts on business and management	Weekly and monthly
3. Legi-Slate, Inc. Washington, D.C.	Legi-Slate	On-line access to federal and selected state legislative information	Daily
4. Mead Data Central New York, N.Y.	Nexis	On-line access to full text from more than 50 publications and wire services	Varies with each data base
5. Bibliographic Retrieval Services Latham, N.Y.	BRS/Search	On-line access to more than 60 data bases on science, technology, business, economics and other areas	Varies with each data base
6. Dun & Bradstreet, Inc. Parsippany, N.J.	Dunsprint	On-line access to D&B financial reports on U.S. businesses	Daily
7. Bank Administration Institute Rolling Meadows, Ill.	Innerline	On-line access to banking and financial information	Varies with each data base
8. Pergamon International Information Corp. McLean, Va.	Patsearch	On-line access to U.S. patent citations and abstracts	Weekly
9. System Development Corp. Information Service Santa Monica, Calif.	Orbit Search Service	On-line access to more than 70 data bases in science, technology, business and other areas	Varies with each data base
10. Viewdata Corp. of America, Inc. Miami, Fla.	Viewtron	Videotex offering of news, data bases, entertainment and financial services	Varies with each data base or service offered
11. Standard & Poor's Corp. Englewood, Colo.	Compustat	On-line access to financial reports on U.S. and Canadian businesses and financial institutions	Weekly
12. American Psychological Association Washington, D.C.	Psycinfo	On-line access to citations and abstracts from *Psychological Abstracts*	Monthly
13. Source Telecomputing Corp. McLean, Va.	The Source	On-line access to a variety of business and consumer-oriented data bases and computer services	Varies with each data base or service offered
14. The Bureau of National Affairs, Inc. (BNA) Washington, D.C.	Laborlaw	On-line access to information on federal and state judicial and administrative decisions on labor and employment	Monthly
15. Official Airline Guides, Inc. Oak Brook, Ill.	OAG Electronic Edition	On-line access to North American and international airline schedules	Monthly
16. Management Contents Northbrook, Ill.	Management Contents	Citations and abstracts on business and management available on-line or in print	Monthly
17. Newsnet, Inc. Bryn Mawr, Pa.	Newsnet	On-line access to full text of 120 business-oriented newsletters on specialized subjects	Varies with each newsletter
18. Institute for Scientific Information Philadelphia, Pa.	Scisearch	On-line access to citations from scientific and technical literature	Monthly
19. Information Access Co. Menlo Park, Calif.	Magazine Index	Citations to popular U.S. and Canadian magazines available on-line or in microfilm	Monthly
20. Congressional Information Service, Inc.	American Statistics Index (ASI)	Citations and abstracts to U.S. government statistical documents available on-line and in print	Monthly
21. Economic Information Systems, Inc. New York, N.Y.	X/Market	On-line access to information on sales and purchases of U.S. businesses	Three times yearly
22. Dow Jones & Co., Inc. Princeton, N.J.	Dow Jones News	On-line access to full text of the *Wall Street Journal* and other business news publications	Continously (direct); weekly (BRS)
23. Disclosure, Inc. Bethesda, Md.	Disclosure II	On-line access to financial information on publicly held U.S. corporations	Weekly
24. Business International Corp. New York, N.Y.	BI/Data	On-line access to annual time series data on international economics and finance	Daily (General Electric Information Services Co.); quarterly (other distributors)

1. Many of these companies have companion or parallel products available in print or in microform. The reader should contact the producing company for more detailed information about available delivery formats.

2. The reader should contact the producing company for exact, current information on content, prices and sources of availability.

IN DEPTH

Existing Information Resource Investments

	1970		1980	
	Internal	External	Internal	External
Data	99%	less than 1%	95%	less than 1%
Text	less than 1%	insignificant	2%-3%	insignificant

Predicted Growth in Information Resource Investments

	1985		1990	
	Internal	External	Internal	External
Data	85%-90%	3%-5%	60%	5%-10%
Text	6%	3%-5%	10%-15%	15%-20%

Managers' Predictions on Data Sources

(Continued from In Depth/3)

Traditionally, MIS departments have been primarily concerned with creating internal data bases and information systems to support the large number-crunching applications such as inventory control, personnel, payroll and financial accounting. Most of the facts and figures in these data bases and systems come from inside the company (records, files, reports and so forth).

In the few instances when external data was needed to combine with internal data, the data elements were brought in by tapping print journals or financial and business reports or government statistical reports. Rarely did organizations tap such data directly in on-line, machine-readable formats from commercial data bases.

Of course, in the '60s and '70s relatively few external, machine-sensible information resources existed. Now, however, according to one estimate, the number of commercially available on-line data bases is approaching 5,000. Most are not even listed in catalogs yet, and the line between electronic mailboxes and on-line data bases is very thin.

Until recently, data base management software was not yet sophisticated enough to deal with the more complex problems of text information storage, handling and retrieval. Now, however, DBMS packages can easily handle both data and text files, even in integrated document contexts or document image contexts.

'Until recently, data base management software was not sophisticated enough to deal with the more complex problems of text information storage, handling and retrieval. Now, however, DBMS packages can easily handle both data and text files, even in integrated document contexts or document image contexts.'

But instead of bringing in such external data, replicating it and making it "resident" in internal files, MIS directors may find it more cost-efficient to let the providers and vendors keep the data base current and simply download the data once accessed from the providers and vendors.

Several years ago, I surveyed MIS directors in 120 companies to find out how they saw the evolution of external text data base access and use. The consensus of this sample of DP executives was that external information resources clearly would be a growth area (see box).

Many observers of the information marketplace believe that a large segment of the "software explosion" will come to depend on a symbiosis

(Continued on In Depth/10)

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IN DEPTH

— A Forum for Information Policies, Opportunities —

The Information Industry Association (IIA), headquartered in Washington, D.C., sees itself as a "business-oriented response to the so-called 'information revolution' in the United States." This association:

1. Serves a $10 billion-plus industry with an annual growth rate of 20% to 30%.

2. Provides a continuing forum for all information-content, communications and computer companies.

3. Helps those companies participate in, take advantage of and profit from the development and operation of the vertical communications structure that is emerging nationwide.

4. Convenes meetings, issues publications, contracts for surveys, prepares testimony, negotiates with federal agencies and provides other arenas for member companies to interact with other participants in the information marketplace.

5. Produces an annual membership directory and publishes a weekly newsletter for insiders.

6. Functions through three councils: Business Operations, Public Policy & Government Relations and Future Technology & Innovation.

The IIA will hold a conference Nov. 7-9 at the World Trade Center in New York City. There, the association expects to release the findings of the second financial survey of the industry — *The Business of Information Report 1983*. Researched by the A.C. Nielsen Co., the report will profile the industry's subsectors, describe the current and projected marketplace, give some indication of collaborators and competitors and identify the key executives and professionals in the business.

The following kinds of product and service lines will be described:

- Library and information networks.
- Software products.
- Abstracting and indexing services.
- Computerized searching.
- Consulting and planning services.
- Data base producers and publishers.
- Data collection and analysis services.
- Information on demand.
- Library management systems.
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- On-line vendors/telecommunications networks.
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- Cable TV.
- Community information and referral systems.
- Document delivery systems.

The IIA has also published a four-volume handbook, *Understanding U.S. Information Policy*. The core of this handbook is a list of nearly 150 "policy building blocks" — concerns and issues of broad interest and consequence such as AT&T restructuring, the Sony Betamax case, government's role in the information marketplace and copyright issues.

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IN DEPTH

(Continued from In Depth/8)
between applications software and the products and services of information companies.

Mechanics of Distribution

Delivery modes vary across the spectrum — data communications services and networks, electronic mail/messaging systems, facsimile, local-area networks, electronic publishing, print and microform publishing, satellite services, teleconferencing, telegram, telex, videotex/teletext, two-way interactive cable television and voice communications services.

Almost all of the on-line vendors and telecommunications networks charge a base subscriber fee, a one-time connect charge and then a use fee on top of those charges based on the actual time subscriber users are plugged into their networks and computers.

These fee structures can become somewhat complex, depending on whether subscribers are profit-making or not (for example, educational institutions), the kind of data base accessed (publicly available or privately created) and the specific search algorithm selected.

Some algorithms are very powerful, and vendors tend to charge more for them.

While "information-content" companies must be sensitive to the needs of their subscribers and clients to ensure they pick the right delivery systems (or right mix of systems), still their distinctive niche in the electronic marketplace comes from the contribution of their information professionals — scientists, editors, abstractors, indexers and product designers as well as marketers. Sometimes the packaging and marketing of the product in a particularly innovative or creative way is the biggest challenge.

Integrating Resources

For the MIS executive, the challenge is to find a way to integrate both the internal and external information resources into a single, synchronized total enterprise information resource environment.

One approach to marrying internal and external data bases and resources is a "knowledge gateway system" using a meta-knowledge base.

Missing at the moment is a focus on the internal-external interface. The linkage problems are too complex to be solved by just throwing a data base management system into the breach.

Companies must develop a matrix of internal and external information flows and holdings first at the generic-information-class level and second at the data-element level to see where internal and external flows and holdings are identical, similar or quite different.

They must then analyze the two streams side by side to identify overlaps or gaps, where neither internal nor external information resources are meeting needs of company personnel. Only after organizations complete this information management analysis should they attempt to move toward developing the meta-knowledge data base itself, which, by definition, will meld internal and external flows and holdings. If an MIS director thinks this is a simple software programming problem, he has been in solitary confinement too long.

About the Author

Forest Woody Horton Jr. is a Washington, D.C.-based consultant specializing in information management.

From 1975 to 1978, Horton directed the Information Management Study for the Commission on Federal Paperwork, which was responsible for promulgating the concept of information resource management.

Prior to that, Horton directed MIS and DP staffs for the Executive Office of the President, the State Department, elements of the Department of Defense, the Environmental Protection Agency and the General Services Administration.

Horton is author or editor of five books in the information management field and has been a contributing editor to a half-dozen information-related publications. He has also held teaching tenures at several universities, including the University of Maryland, Syracuse University and American University.



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University's Role Is Education, Not Programming

A recent letter to *Computerworld* [Jan. 17] by A.W. Holtsberry of Westerville, Ohio, stated, "During the past year I have discussed the shortage of skilled programmers and programmer analysts with at least 50 different senior DP executives. At least 50% of the executives with whom I spoke stated that they never hire new graduates."

Does this imply that the nation's universities are not providing proper instruction of their students for entry-level positions in industry?

There is no doubt that industry today suffers from a lack of qualified programmers. There now is approximately a four-year backlog in the generation of application software.

But it is not the role of the universities simply to turn out programmers. In particular, computer science departments in universities must produce graduates who are educated in many aspects of computer science, who understand systems architecture, data base and so forth and who are flexible and can adapt their skills to the current and future needs of industry, business and government.

The computer field is changing at an amazing pace, creating totally new developments every five years. The universities would be remiss if they turned out graduates whose narrow skills had only a five-year tenure. And industry would be remiss if it expected the universities to do so.

You used the phrase "proper instruction of their students." A

Leonard Kleinrock, Educator, Engineer

What function should universities serve in the education of computer science undergraduates? Science writer Irving Bengelsdorf interviewed Dr. Leonard Kleinrock, UCLA professor and president of Technology Transfer Institute, for his perspective, which spans academia and industry.

On May 5, 1982, Kleinrock and Dr. Lawrence G. Roberts shared the Lars Magnus Ericsson Prize in recognition of their contributions to packet switching. In ceremonies at the Stockholm Museum of Technology, His Majesty King Carl Gustaf XVI of Sweden presented the two with diplomas, gold medals and an award of $35,000.

The Ericsson Prize, established in 1976 to mark the centennial of the founding of the L.M. Ericsson Telephone Co., is awarded every third year to those individuals "who make especially important scientific and technological contributions in telecommunications engineering."

Kleinrock, professor of computer science at the University of California at Los Angeles, holds a bachelor of science degree in electrical engineering from City College of New York (1957) and a master's and doctorate in electrical engineering (1959 and 1963) from MIT. He is a member of the National Academy of Engineering, is both a Guggenheim and IEEE Fellow and serves on IBM's Science Advisory Committee.

(Continued on In Depth/12)



Dr. Leonard Kleinrock

IN DEPTH

university's role is education, not training.

For a university to focus its teaching on the development of programming skills would be the same as focusing an engineer's education on the development of drafting skills.

Such training is properly done in two-year community colleges, in qualified trade schools and at on-the-job training in industry. We at the university must teach fundamentals as well as state-of-the-art technology.

But since there is a shortage of programmers, it seems these community colleges or trade schools are not training them.

Apparently not. I feel, however, that the programmer shortage will be solved shortly. It has been estimated that if we continue to absorb programmers at our present rate, then there would be a need for 27 million programmers by 1990!

Clearly, even if the universities did turn out to be larger than the total number of

Kleinrock

(Continued from In Depth/11)

Kleinrock's research, which emphasizes the modeling, analysis and measurement of computer networks and queueing systems, has led to the publication of more than 120 professional papers and three books dealing with these subjects.

Kleinrock also serves as president of Technology Transfer Institute, the Santa Monica, Calif.-based company that provides consultation services and sponsors seminars in the fields of networks, communications, data processing systems and management.

Technology Transfer Institute's fall 1983 seminar schedule includes a three-day seminar by Kleinrock titled "Computer Networks," a five-day seminar with James Martin speaking on "The DP Crisis and its Solutions" and a three-day seminar with Jerome Svigals and Donald Long discussing "Emerging to Electronic Banking." In addition, a one-time, four-day seminar featuring Edward A. Feigenbaum will deal with "Knowledge Base and the Fifth Generation."

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THE UNIVERSITY'S ROLE

IN DEPTH

'A future army of programmers is not needed. The programmers will largely be dealing with more sophisticated tasks.'

women then alive in the United States.

So, clearly the estimation of the need for 27 million programmers by 1990 is way off the mark. The U.S. now is strangled in a jungle of software development and maintenance. But there really is no need for so many programmers.

In my opinion, the day of the "Cobol-type" programmer is limited. Currently, the fourth-generation languages like Mantis, Focus and Ramis provide application generators that allow the users to bypass the DP department for their application software.

The recent work of Margaret Hamilton and Saydean Zeldin now allows us to create bug-free software that automatically generates logically correct programs. Although these systems are dependent upon a profoundly mathematical base, the mathematics is hidden under a user-friendly set of tools.

These new software systems are powerful and practical because they can be used by individuals with no knowledge of either mathematics or programming to design provably correct systems. These will allow a user — with or without a programmer's help — to specify what he wants to have done.

So, the present problem involving a deep backlog of user applications will likely be solved by the introduction of the aforementioned user-oriented nonprocedural languages. The work will be offloaded to the less sophisticated user, who also will get immediate feedback regarding his efforts.

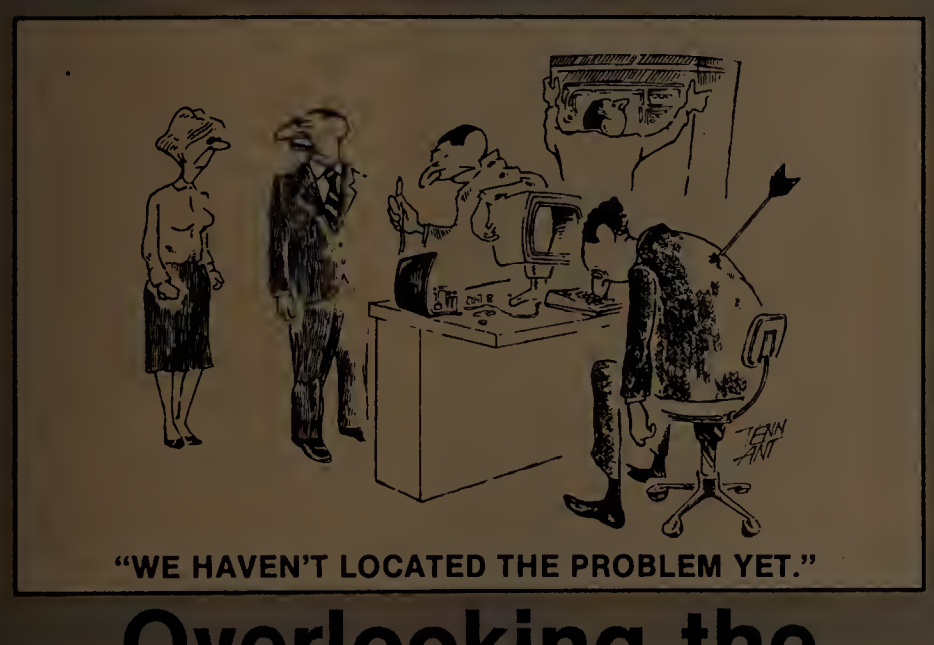
A future army of programmers is not needed. The programmers will largely be dealing with more sophisticated tasks.



King Carl Gustaf XVI of Sweden presents the Ericsson Prize to Leonard Kleinrock and Lawrence Roberts for their work in packet switching. Roberts is president of GTE Subscriber Network Products.

Companies will have difficulty surviving if top management is slow to recognize and make the revolutionary changes. Information now is available at the touch of a terminal, and management must see to it that all personalized data bases are consistent, intercommunicative and able to be modified readily. Otherwise, DP will become a modern Tower of Babel.

Obviously, what is preventing these changes from taking place is the large investment in existing software and file systems and the enormous cost needed to convert it. But I think it is better to bite the bullet now. The longer a company waits to



Overlooking the human dimension?

Isn't it true that every information executive basically has access to the same hardware and the same software?

What is it then, that causes one information shop to hum along productively, while another limps along, boasting a reputation as a burden-some cost center.

The essential difference usually can be found in the "human dimension," an aspect of senior-level information management that too often is overlooked.

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IN DEPTH

convert to the newer techniques, the more it eventually will have to pay.

But is there a place for programming in university instruction?

Indeed there is, but in a complementary rather than an exclusive role. University students should gain general programming skills as needed in their science and engineering classes and in any pertinent arts and humanities courses, as well as in their projects and research. But industry cannot expect university graduates to be trained in any particular industry's specific programming needs. This is a training role for industry itself.

In the same sense, a university should not necessarily teach a control engineer the detailed control theory for the pharmaceutical industry, for example, but should give him a good background in general control systems. It is worth repeating that the university makes available to the work force bright young graduates with generalized skills who are flexible enough to adapt to the specific and changing needs of a particular employer.

If the role of the universities is not to teach programming, then what should universities teach about the field of computers?

This is an ongoing controversial question because computer science is such a young, rapidly changing yet all-encompassing field. Its principles are not as fully developed as, say, electrical engineering, which is a well-understood, older discipline with a well-developed body of knowledge, common principles and excellent textbooks.

The curriculum in computer science at University A may be quite different from that at University B. One school may emphasize computer languages, another hardware and still another artificial intelligence. Not only are the university offerings in computer science varied, but they also keep changing with time. Despite various attempts, there is less than universal agreement among academicians as to *the* curriculum in computer science.

Nevertheless, in my opinion, students in universities should certainly be familiar

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with such subjects as data structures, data base management, programming languages, operating systems, computer communications, discrete mathematics, architecture, knowledge base and expert systems.

The field of computer science is so new that even its professors at universities are continually on a learning curve.

We publish a *UCLA Computer Science Quarterly* in which letters from alumni working in the field provide excellent feedback from their employment experiences. They tell us what they think the UCLA computer science and engineering curricula should contain.

We pay attention to and learn a good deal from these letters.

So you feel industry, government and business should be hiring university computer science graduates for their entry-level positions?

Absolutely. Not only do university graduates represent huge potential future assets, but the luxury of being able to hire experienced DP professionals soon will disappear. The latter are in very short supply.

Along with industry's difficulty in recruiting personnel, there also is the associated difficulty in retaining them. Because the computer industry is in a great state of flux, there is a great deal of mobility in the job market as people continually are hired away by new start-up companies.

Industry should ask itself: What keeps a person loyal to his job? I feel an exciting product or a challenging environment plays a more important role in retaining personnel than does salary.

Do you think the complaints from the computer industry about the alleged maleducation of university graduates are specific to that industry, or are such complaints also voiced by other industries?

This is an old story. Engineering companies have complained for years that university graduates are poorly trained for their specific industrial needs. The same is true for many manufacturing companies. The only difference with the computer industry is that it operates at a much greater rate of change than has been experienced by any other industry before it.

Whatever difficulties do crop up, therefore, become exacerbated.

I feel that part of the complaints are based upon the eternal dichotomy between the academic and industrial worlds. Students in universities have their professors as role models, and they are concerned with the treatment of such technical issues as may be addressed in their professional journals.

Industry, however, deals with the totally different issues — cost, product life cycle, software life cycle, maintenance, availability, manufacturing, flexibility, safety and so on — that are described in trade journals.

Students should certainly be aware of such issues, but they need not be part of their

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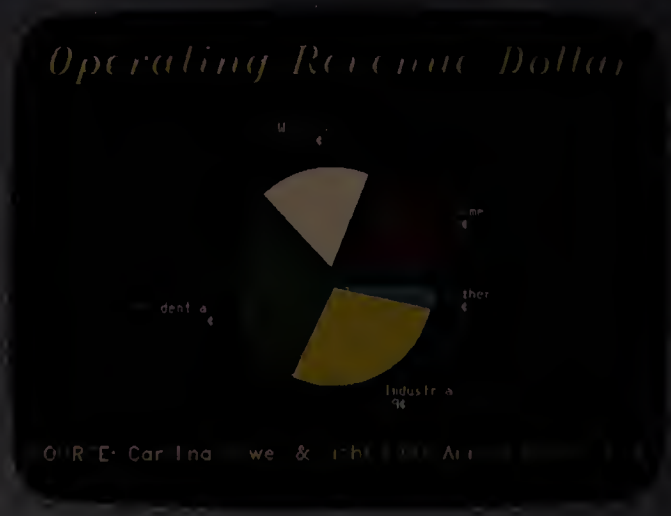
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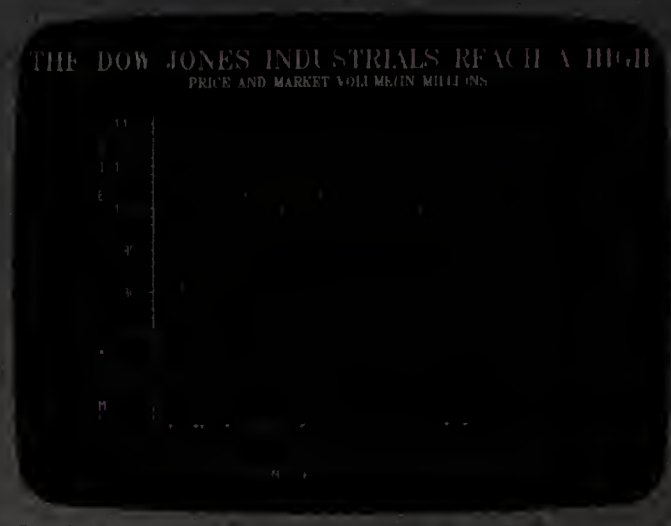


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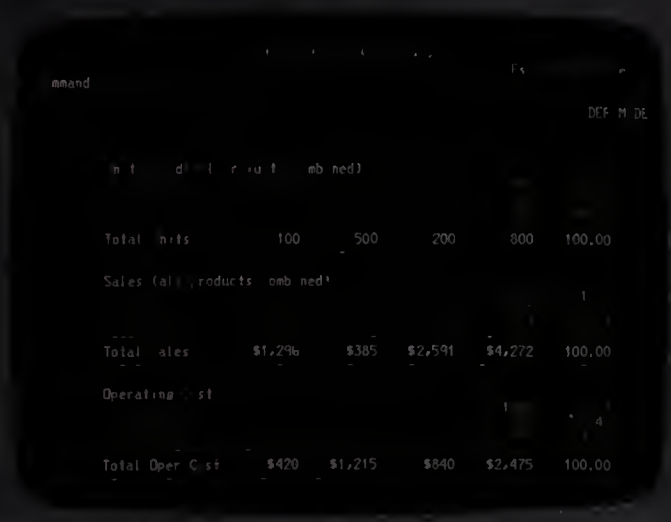
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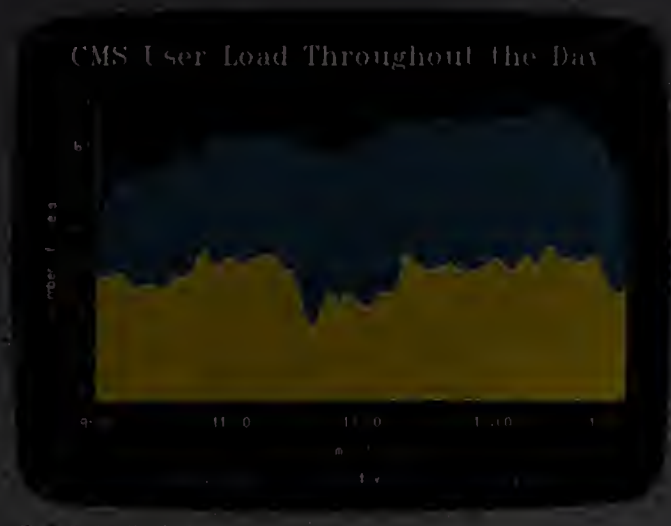
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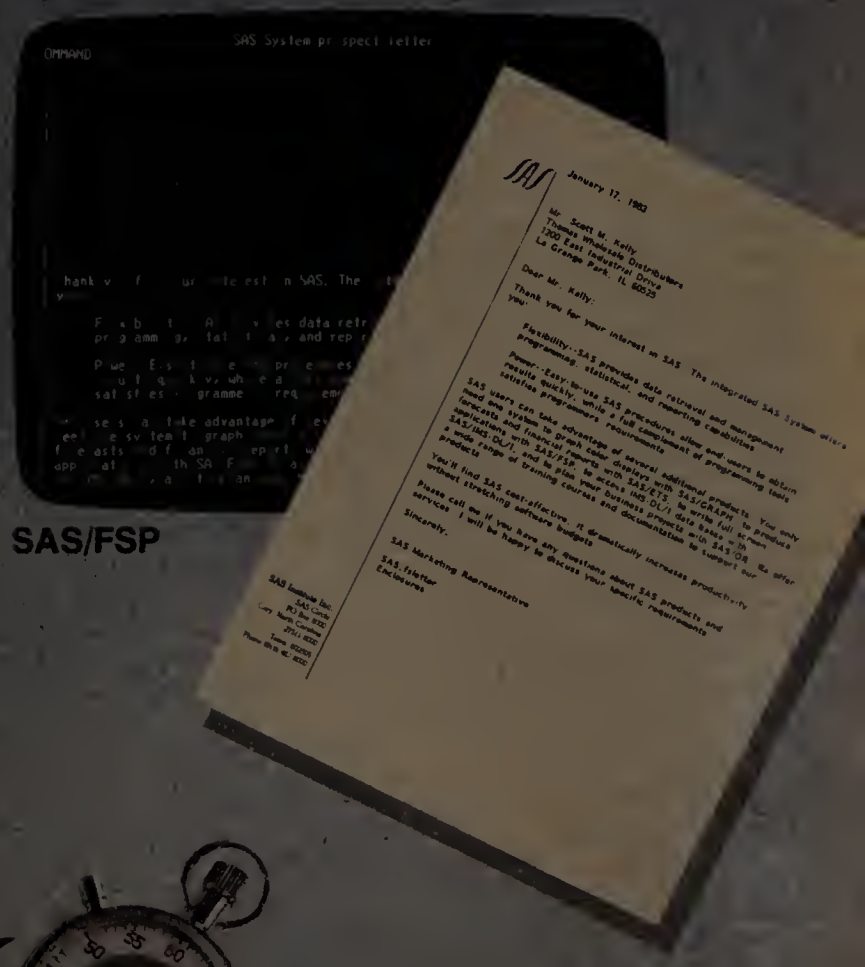
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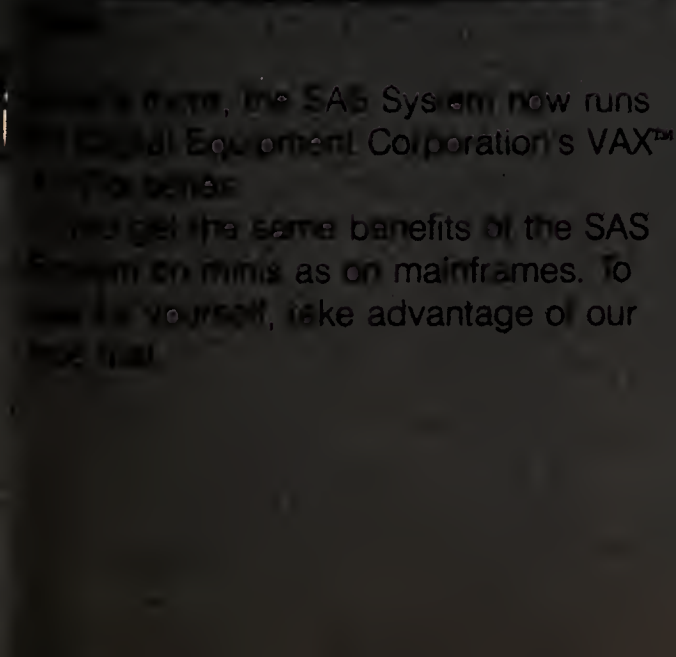
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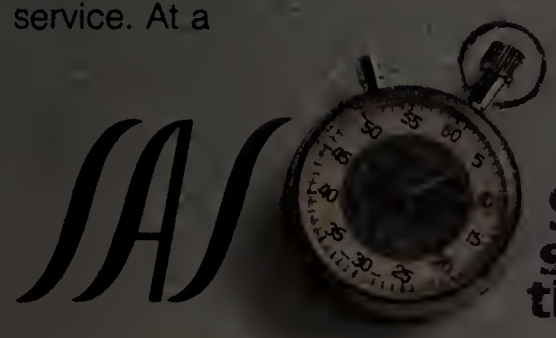


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IN DEPTH

formal education.

I tell my students that in addition to reading their professional journals, they should also look at these trade journals, at least, to become aware of what is going on in the "real world."

I suspect that this academic-industrial dichotomy in the world of computers will never be bridged completely, because the same dichotomies still exist in the older engineering disciplines.

'Our social dynamic is competitive rather than cooperative. I feel this will have to change. What we now need is a greater sense of cooperative national goals. The computer industry must cooperate much more both with government and universities.'

We have talked about what the computer industry wants of universities. What do you, as an academician, want industry to do?

This is a crucial question because the computer field is not developing solely as an American industrial enterprise, as did many other industries in the past.

We now have to contend with an extremely potent foreign competitor, Japan Incorporated. The Japanese have been extremely successful in dominating the consumer electronics industry and, in the near future, probably will dominate the computer industry as well. They probably will beat us out in the 256K memory chip and, very possibly, in microprocessor chips.

To paraphrase Dr. Lewis Branscomb, chief scientist at IBM, the Japanese have as their goal to achieve not only parity, but superiority in computer technology, regardless of how much money and time it takes. That is a frightening situation to contemplate.

The Japanese social dynamic permits a hand-in-glove cooperative effort to be mounted by industry, government and universities.

This kind of effort is what is going on as Japan starts toward the fifth-generation computer. But our social dynamic is competitive rather than cooperative.

I feel this will have to change. What we now need is a greater sense of cooperative national goals. The computer industry must cooperate much more both with government and universities.

Whatever efforts are undertaken, they must be large in scope with respect to personnel, money, equipment and joint projects.

Some of these now are being realized: the establishment of Microelectronics and Computer Technology Corp. (MCC) to work toward fifth-generation computers, the supercomputer effort recently announced by the Department of Defense, the multimillion-dollar and multiyear computer science research contracts from the National Science Foundation and the large equipment grants to universities from IBM.

So, awareness of the powerful external Japanese threat is here, but many more intersocial and intereconomic barriers will have to be reevaluated in an attempt to meet this threat.

What role, if any, should universities play in the face of the Japanese threat?

The universities are presently involved in many ways, both directly and indirectly.

Through support by the Department of Defense Advanced Research Projects Agency (Darpa), many universities will be participating in the supercomputer project.

This is a multiyear project of large magnitude.

In a more indirect manner, university participation can be witnessed in joint efforts on the industrial or corporate fronts, such as in

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the recently established MCC Consortium in Austin, Texas. One need only notice the affiliations of many members of the group to be convinced that universities are indeed playing a role.

Probably, though, the most important arena in which universities can help avert Japanese dominance is in the field of artificial intelligence and expert systems. It is to these areas that great attention must be paid if we are to head off this so-called threat. AI has come of age in research institutions here in the U.S., and our universities play vital roles in maintaining and extending the lead we hold in the development of expert systems.

'The most important arena in which universities can help avert Japanese dominance is in the field of artificial intelligence and expert systems . . . Our universities play vital roles in maintaining and extending the lead we hold in the development of expert systems.'

Do you think the pace of change in the computing field will slow down soon?

Absolutely not. The problem associated with rapidity of change will get worse, not better. As the reliability and performance of microchips increase, and as the cost decreases, the two major technologies of computers and communications will continue to converge. Local, national and international information networks are here.

Both IBM and AT&T suddenly find themselves competing in the same marketplace. Both deal in the handling of information.

We joke about the likelihood that by the end of this decade we may be purchasing our telephones from IBM and our computers from AT&T. I feel the fusion of these two major technologies will give rise to ever-novel, giant technological advances as yet undreamt of.

How do universities fit into this "rapid change," given that they are slow-changing institutions?

I have to take exception to the statement that universities are slow-changing institutions.

In the area of computer science, that contention simply does not hold true. In fact, universities very often lead the way when it comes to innovative systems, software and architecture.

Hardware would not be included in this category, however, since universities are not usually in the business of fabricating large systems.

Is the hardware that universities have obsolete or up-to-date? Are university facilities suitable for training for industry?

In order to answer that, one must acknowledge, however reluctantly, the present division of universities into "haves" and "have nots." On one hand, the "haves" are in many ways superior to corporate America in terms of sophistication and innovation of systems, while falling somewhat short in "horsepower." The "have nots," unfortunately, lag behind in almost all areas — for example, horsepower, sophistication and terminal access.

The problem is further aggravated by the self-perpetuating cycle of the attraction of bright, well-motivated researchers and developers to better equipped environments.

About the Interviewer

Irving S. Bengelsdorf is a technical writer/specialist at Caltech/Jet Propulsion Laboratory in Pasadena, Calif.

Bengelsdorf contributes science columns to the Los Angeles Herald Examiner *and has written newsletters, magazine articles and books dealing with popular-level explanations of science and engineering subjects. In addition, he has taught both chemistry and journalism on the college level.*

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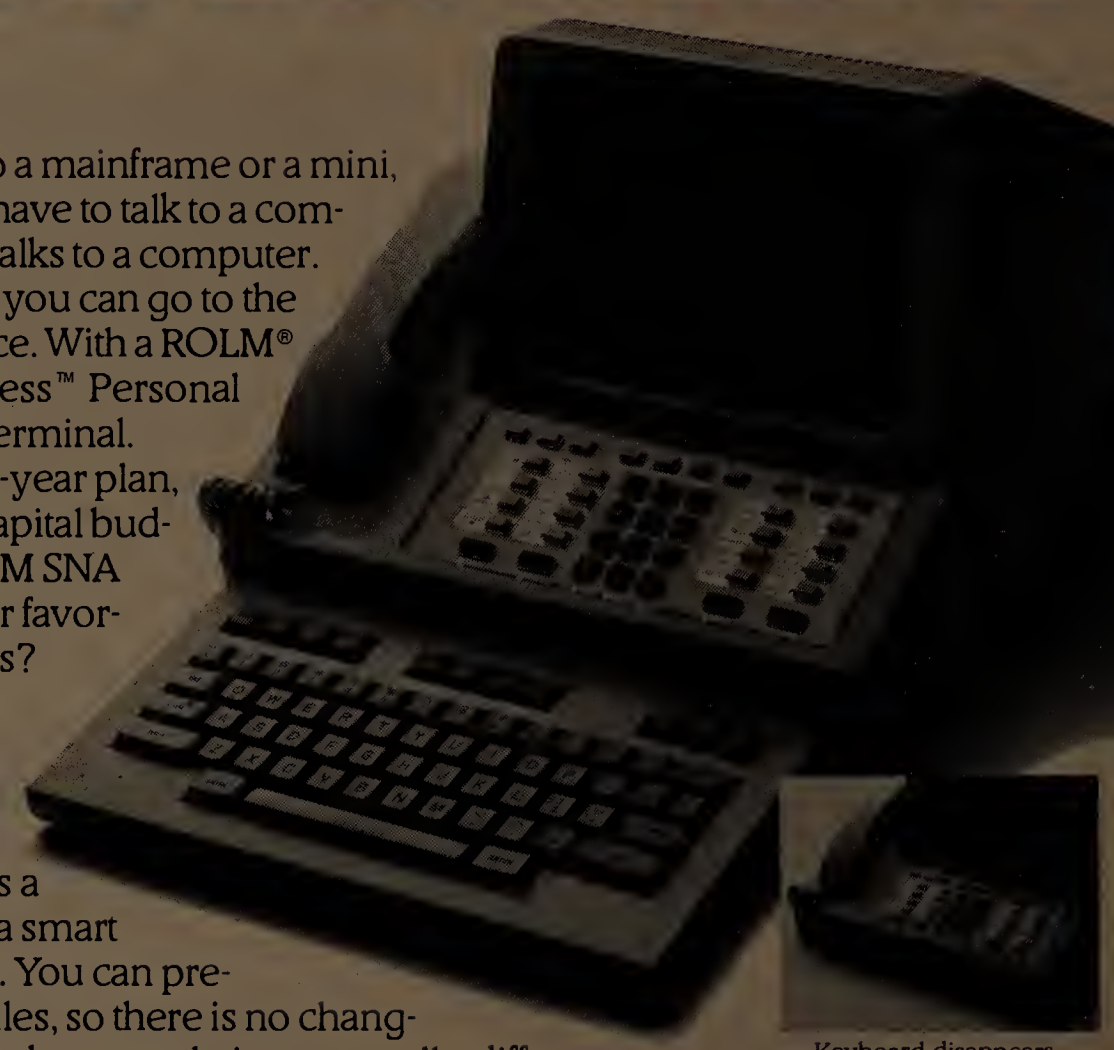
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Managing Employee Careers

"In many cases, the only time an organization expresses an interest in its employees is when it must fill a job vacancy."

"Employees should share in setting policy and direction."

"An organization should create an environment that stimulates employees to plan."

By Michael J. Albrecht Jr.

Most people allow luck and circumstances to shape their careers. If people refuse or neglect to plan their careers, does their employer have a responsibility to do it for them? The answer is an unqualified yes — if that organization wants to ensure its own survival.

An organization should not take over career planning from its employees, but create an environment that stimulates and encourages them to plan. The task must be interactive, formally recognizing the partnership between the company and the employee.

In many cases, the only time an organization expresses an interest in its employees is when it must fill a job vacancy. This need triggers a search that may result in a career move for some "lucky" individual in that organization. Some organizations don't even spend time to search inside for a qualified candidate, but recruit from the outside, ignoring the resources already in place.

In addition to career planning, an organization has the responsibility to make certain that its members understand its basic purpose. It has the responsibility to show how the organizational structure will assist in carrying out those objectives and how each department within this structure contributes to reaching company objectives. If you agree with the premise that an organization has those responsibilities toward employees, you may ask:

1. How does a department go about developing its own objectives and functions?

IN DEPTH

2. What is the most effective way to develop a career path network that accomplishes the department's objectives and at the same time stimulates employees?

3. What framework is necessary to help employees plan their careers?

To address these questions properly, top management must be committed to employee development. Management must believe a real payoff will result when people understand what job opportunities are available to them and what their potential is.

In June 1977, I was appointed director, information systems, of a large natural gas distribution company and was forced to translate these beliefs into practice.

The department's voluntary turnover averaged around 25% and morale was low. Interviews with department heads revealed a lack of respect for information systems. The department had not implemented a new system since 1970 (seven long years), even though the need for new systems was overwhelming. Technology had bypassed long-time incumbents.

As a general rule, data processing systems retain their usefulness for six to eight years, usually not more than 10. This organization had four systems that had been in operation for 14 years plus (in 1977). The most current system was seven years old. The department had lapsed into a maintenance function, which grew increasingly complex with changes to programs and the operational environment — hardware and software.

Information systems was on a treadmill which would not only spell disaster for the department but the company as well. Local recruiters confessed that they referred only mediocre or below-average candidates to the organization because of the environment and its reputation for not doing anything that could be considered "state of the art" in data processing.

Situational Analysis

We elected to take a "total systems" approach to this problem. After many discussions with the director of human resources planning and development, information systems management laid out a comprehensive program to turn around its department. We needed to be

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responsive to the organization's needs and started by completing a situational analysis, describing the problem in detail and then setting a number of objectives for ourselves:

1. Identify the information needs of the entire company, factor those needs into discrete data processing systems and prioritize those systems. Develop a long-range data processing plan.

2. Reduce maintenance to 60% of the total information systems work load and productively apply the remainder of the work force to develop new systems on a priority basis. This objective required a cost/benefit analysis system.

3. Reduce voluntary turnover by 30% within one year so that a continuity of talent could be maintained and productivity increased.

4. Improve the work environment to attract and retain people who could implement our data processing plan.

5. Improve the reputation of information systems by developing with our users a list of "products" (program fixes and enhancements) to be delivered at the end of each quarter.

6. Deliver at least one new subsystem each year.

7. Produce proper documentation that would allow us to maintain operating programs on a timely basis.

Group Sessions

We employed an outside consultant to measure the attitude of information systems personnel and to pinpoint problem areas that "blocked" people from producing desired results. Following analysis of the survey, the consultant conducted group sessions that addressed identified blockages, defined them in more detail and then listed a number of solutions. Three projects emerged from those sessions which information systems people felt would help improve the working environment (listed here in priority sequence):

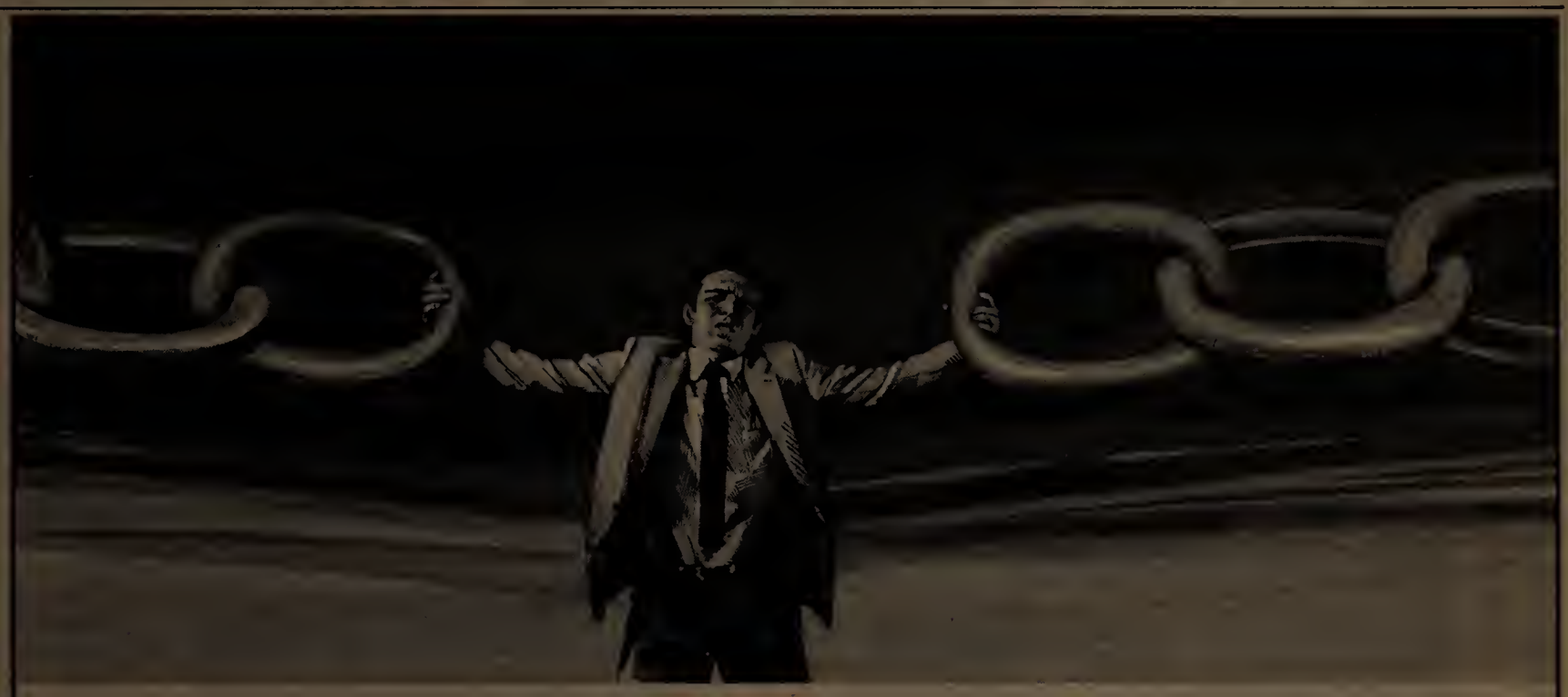
1. Develop a career path program for information systems personnel. The program should allow technicians to remain in that function, but permit growth without requiring a switch to management.

2. Provide training for supervisory personnel and their subordinates to improve communications and establish a support network that would allow people to cope with a rapidly changing environment.

3. Improve the communications process between the programming group and the operations group by clearly identifying the responsibilities of each unit and by specifying the documentation requirements for production programs.

In addition, information systems developed a long-range plan based on company objectives by reviewing the company's strategic plan and interviewing top executives to determine information requirements. This plan provided the basis for our career path program.

Let me now return to the three questions raised above and describe for you how we developed answers to those questions and constructed



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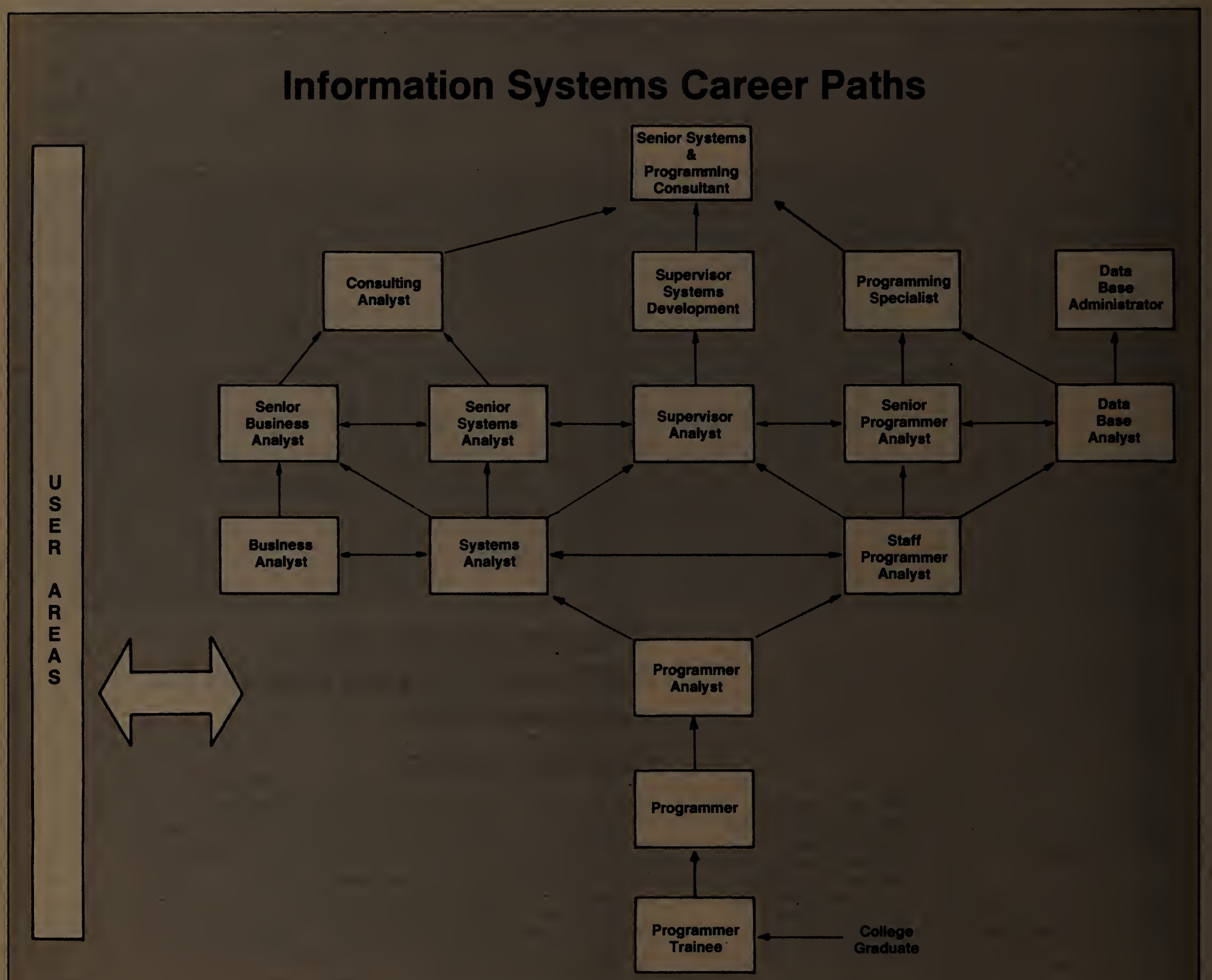


Figure 1

#1

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a career development approach for the information systems department. Even though the example used is an information systems department, there is no reason why the techniques described here cannot be applied to many other types of departments.

Our long-range data processing plan and company objectives provided us with the base for developing a department mission. With a firm, well-founded direction in place, we identified career opportunities (career paths) within the department that were needed to accomplish our department objectives. This career path network turned out as follows:

The development of job families (systems analysts, business analysts, programmers, the blocks arranged horizontally in Figure 1) and the job levels for each family were identified by department management. Managers needed to assure a future to department incumbents as well as those they were trying to attract to the organization. In short, the structure had to give us a competitive edge in the job market.

Outlining Functions

Once the network was established, we asked incumbents within the different job families to identify their job functions, which fell into six major categories:

1. Information processing and technical knowledge.
2. Business and system application.
3. Project and personnel supervision.
4. Communications.
5. Management techniques.
6. Company environment and knowledge of user areas.

We took considerable time in group discussions to ensure that everyone agreed to the functions and that the wording was proper. After completing the list of functions, the groups went to work to list the skills required for each one.

In my experience, job descriptions usually intermingle functions and skills, leaving their readers confused. The groups had problems differentiating between functions and skills, tending to confuse the two. A function is a primary task, duty, responsibility or activity. Skill or knowledge is what a person needs in order to perform that function. To a lifeguard, swimming is not a job function but a skill he employs in carrying out his job function — namely rescuing people who are drowning.

In an information systems department, the same function is carried out by a number of people in different positions at different levels. In order to equitably appraise performance, the expectations have to be established by position. We decided to use five levels of performance, based primarily on the amount of supervision necessary or expected to perform a particular function, as well as the complexity of the task.

Information Systems Job Functions

I. INFORMATION PROCESSING AND TECHNICAL KNOWLEDGE	Programmer Trainee	Programmer	Programmer Analyst	Staff Programmer Analyst	Systems Analyst	Business Analyst	Senior Programmer Analyst	Senior Systems Analyst	Senior Business Analyst	Data Base Analyst	Programming Specialist	Consulting Analyst	Data Base Administrator
	Performance Standard (* = Key Function)												
APPLICATIONS DEVELOPMENT & MAINTENANCE													
1. Develop system and function descriptions.					3*	3*		4*	4*			5*	
2. Evaluate various system alternatives and identify the most efficient means of satisfying user needs.					3	3		4*	4*			5*	
3. Identify and define the data required to perform the system functions.					3*	2		4*	3			5*	
4. Develop system design specifications.				2	3*		3	4*			3	4	
5. Perform a quality assurance check on the system design.									3			4	
6. Develop procedural flows showing interrelationships between manual and computerized functions.						3			4			4	
7. Develop procedural flow showing operation of designed system.					3			4				4	
8. Determine the most efficient means of providing specified data to satisfy the user functions.		1	2	3*	3*	3	4*	4*	3		4*	4	
9. Determine the requirements for data entry verification of system input.			1	2	2	2	3	3	3		2		
10. Define inputs, outputs, files and storage medium and document the steps required to process the data.		2	3*	3*	3		4*	4			3	3	
11. Develop manual controls and other user procedures that are related to the system design.			1	2	2	3	3	3	4		2	4*	
12. Develop backup methods and procedures to cover conceivable contingencies.			2	3	3		4	4*			4*	4*	
13. Prepare an implementation plan that considers technical requirements and restrictions.			2	3	3*		4*	5*			4	4	
14. Assure that proper testing procedures are followed during all stages of system development, ranging from program module testing up to full system and acceptance testing.				2	3		4*	4*				4	
15. Prepare a conversion plan that covers user and data processing requirements including methods and procedures, timing and detail schedules.					3	2*		4	3*			4	
16. Prepare a cost analysis of a project.					3	3		4	4			4	
17. Prepare a cost analysis of the technical aspects of a project.			2	3			4*			3	3		4
18. Evaluate requests for major system changes and enhancements.				1	3*	2	2*	4*	3	2	3	4	5

Key to Grading System:

1 — Performs under direct supervision in easy to moderately difficult tasks.
2 — Performs moderately difficult tasks with some supervision.
3 — Performs complex tasks with limited supervision.
4 — Is fully competent to perform most tasks without supervision.
5 — Performs tasks without supervision. Others seek his advice.

Figure 2

The five levels of performance we developed are as follows:

1 — Performs under direct supervision in easy to moderately difficult tasks.

2 — Performs moderately difficult tasks with some supervision.

3 — Performs complex tasks with limited supervision.

4 — Is fully competent to perform most tasks without supervision.

5 — Performs tasks without supervision. Others seek his advice.

Our result can best be shown by a sample matrix we developed for one of the categories of functions. Figure 2 shows a job function/performance standard matrix for the "information processing and technical knowledge" category. The asterisks indicate that a particular function is key to that position and will be considered in assessing a candidate's readiness for promotion.

We then developed a similar matrix to emphasize the skills necessary to perform identified job functions (see Figure 3 on In Depth/30). A

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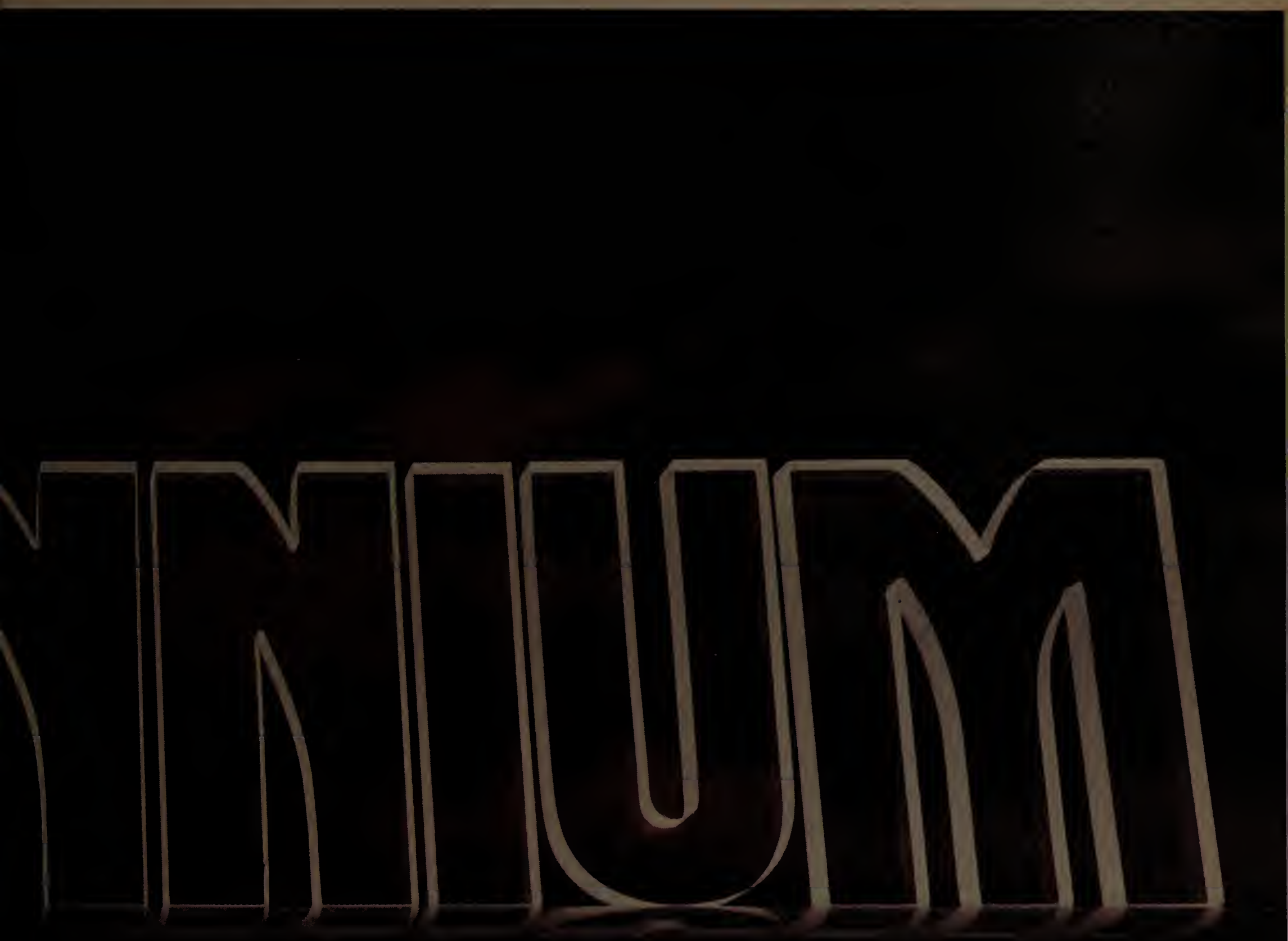
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IN DEPTH

Career Path Knowledge, Skills

BUSINESS AND SYSTEMS APPLICATIONS	Programmer Trainee	Programmer	Programmer Analyst	Staff Programmer Analyst	Systems Analyst	Business Analyst	Senior Programmer Analyst	Senior Systems Analyst	Senior Business Analyst	Data Base Analyst	Programming Specialist	Consulting Analyst	Data Base Administrator.
	Skill Level (* = Key Skill)												
1. General knowledge of a variety of industry applications.					2	2		3	3			4*	
2. General knowledge of the major applications of the company and the functions performed.			1	2	2*	2	3*	3*	3	3	3	4*	3*
3. General knowledge of the system software installed at the company and the functions performed.		1	2	3	2		4*	3*		3*	5*	4	4
4. Knowledge of individual applications' use of the corporate data base.					2		2	3		3*	2	3	4*
5. Knowledge of the system functions, processing features and I/O requirements of the applications in your area of responsibility.	1	2*	3*	4*	3*	3*	4*	3*	3*	3	4	3	3
6. Ability to answer questions about present system functions and general processing features.		1	2*	3*	3	3	4	4	4		4	3	
7. Ability to identify the data and processing features required to satisfy a user request.	1*	2*	3*	4*	3	2	5	4	3	3	3	3	3
8. Ability to identify and evaluate the impact of proposed major changes to the present system functions and processing features.			1	2	2*	2	3*	4	3	3	3	4	3
9. Ability to evaluate efficiency and effectiveness of systems.					2	3*		3	4*			4*	
10. Ability to develop effective user training material.					2	2		3	4			3	

Key to Skill/Knowledge Levels:

1 — Exposure
2 — General
3 — Working
4 — Thorough
5 — Expert

Figure 3

different scale had to be used to properly assess skills or knowledge levels. We developed, again, a five-point scale:

1 — Exposure.
2 — General.
3 — Working.
4 — Thorough.
5 — Expert.

An asterisk was assigned to those items deemed critical to that position.

The teams of job incumbents developed 104 functions and 69 skills as their final product. These matrices were then used to develop job descriptions.

The job descriptions followed a company format, but did not change the wording of functions and/or skills. Of course, only appropriate functions and skills, properly delineated, appeared on each position description.

Throughout this process, interim products were reviewed by information systems management and by the rest of the department. Corrections were only made when necessary.

By the end of this process, all members of the department had a very good understanding of our directions, what we wanted and had to accomplish, the functions we performed to achieve our objectives and the career path available to them.

Rating Scales

Management, however, felt uncomfortable. The work we had done to identify the job each position was expected to perform could not readily be evaluated with the company's performance appraisal forms, which were very general and, in most cases, did not relate to functions performed by information systems people.

When we discussed this dilemma with the director of human resources planning and development, he suggested we develop behaviorally anchored rating scales (Bars) for each one of our positions. With his guidance, we used a process called "retranslation of expectations" to develop a performance measurement tool for each position that had incumbents. This procedure consisted of the following steps:

1. Job-knowledgeable individuals (position incumbents) generated examples of effective and ineffective job behaviors.

2. These behaviors were then sorted into the six job categories discussed above.

3. A second group of raters was given the behaviors and the job dimensions and was asked to re-sort the behaviors into the same categories. Behaviors that did not end up in the same categories as initially sorted were eliminated.

4. The remaining behaviors were rated from 1 to 5 in terms of effective to ineffective behavior: 5 for "outstanding," 4 for "exceeds requirements," 3 for "meets requirements," 2 for "meets minimum requirements" and 1 for "does not meet requirements."

5. Behaviors with a large variability in their ratings were eliminated.

6. A subset of the behaviors is used as a descriptive example for each scale point. In using the scale, the rater was asked to select which set of behaviors the individual performed during the rating period.

Positions with no incumbents could obviously not be "fitted" with a Bars performance appraisal form. Once people moved into the position, we used a management-by-objectives approach until we had enough experience to develop the Bars scales.

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IN DEPTH

functions and the associated skills and knowledge requirements — and the performance appraisal in place, we turned our attention to a tool for career planning.

The performance appraisal identifies skill weaknesses that need to be shored up and provides the basis for the career development plan. After each performance review, the supervisor and employee discuss what has to happen before the employee can be promoted to the next level within his current job family. With the help of a newly developed training guide, courses, seminars and job experiences are outlined for the next six to 12 months.

The training development guide also lists the base requirements for each position and gives an individual the opportunity to start work in getting to a different job family. This opportunity, of course, is dependent on the organization's need for additional people in that area.

It must be pointed out that this career development program takes time and resources and, above all, a strong management commitment. However, a quality result will pay off handsomely for the organization. In our case, we reduced turnover by 40% in one year.

The work in setting up the program, in itself, told informations systems people that management was serious about employees.

We created an important communications tool — our long-range plan. This document was reviewed with the entire information systems staff, along with a discussion by each information systems manager as to what his group was expected to produce over the next year. People knew where the department was going and what new projects and technologies would be implemented. They could see how the career path network (Figure 1) supported this plan and, most important, they could see alternate career paths within the department.

Realistic Evaluation

This system provides the employee with a realistic evaluation of performance. The Bars system gives the individual very specific examples of job effectiveness. After a performance evaluation, the supervisor discusses with the employee what training he needs over the next six to 12 months and what job experiences he will be exposed to during that period. This discussion is documented and passed on to the next level of management. Training is provided through outside seminars and/or a very extensive audio-visual education program.

The supervisor discusses alternative career options with the employee if he is not completely satisfied with the work in his present job family. Of course, the needs of the organization are taken into consideration at this point. If an employee wants to move into an area that is up to budgeted levels, he is blocked until a vacancy occurs.

However, training goals can be set with the supervisor so that the employee can learn the required skills, and his request can be considered when an opening develops. Jobs are filled based on merit.

In addition, the work also improved the group's morale. In one year, attitude scores on a number of scales pulled even with national norms and, in some cases, exceeded those scores.

Our recruiting effort received a shot in the arm because we were able to show new employees where we were going and what opportunities were available.

This kind of career development program allows employees to buy automatically into the objectives of the organization. Employees share in setting policy and direction.

Separation becomes much more painful.

About the Author

Michael Albrecht Jr. is president of M. Albrecht Jr. & Associates, Inc., a management consulting firm based in Grosse Pointe, Mich. The company specializes in corporate long-range planning, data processing and organizational behavior.

Albrecht formerly worked for IBM as a marketing representative and an instructor in its Customer Executive Education Program in Poughkeepsie, N.Y.

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First User of Northern Telecom's SL-1

Bank Integrates Voice, Data With PBX

MINNEAPOLIS — The First Bank of Minneapolis became a pioneer in integrating voice and data commercially on a private branch exchange (PBX) when, in 1978, it planned a major expansion and remodeling of its downtown complex.

Requirements for communications system that would handle both voice and data lead the bank to purchase one of the first Northern Telecom Inc. SL-1 PBX systems.

The telephone system also had to serve the corporate headquarters of First Bank System, a multibank holding company with assets of over $17 billion, of which First Bank Minneapolis is the largest bank.

Established in 1857, First Bank Minneapolis is one of the top financial institutions in the Midwest. The bank had 1982 year-end assets of $5.5 billion and employs 1,900 people. Nineteen eighty-two was also the sixth consecutive year of record earnings for the bank.

Several companies were considered in the selection of the communications system. The contract went to Collins Communications Systems, Inc. for the SL-1 digital business communications system. The SL-1 system installed at the First Bank complex currently connects 2,300 telephones and can grow to up to 4,000 telephones.



The SL-1 Add-On Data Module

"The SL-1 best suited the equipment requirements for the bank at the time," George Holthus, vice-president planning at the First Bank, said. "The ability of the product to handle voice and data concurrently on the same phone line, using a device called an Add-On Data Module (ADM), was a factor in the decision. Not all

(Continued on Page 70)

Processor Said To Emulate IBM 3274-51C

MIAMI — Innovative Electronics, Inc. has announced a communications processor said to emulate an IBM 3274-51C communications controller running Configuration Level A.

The MC-80/6000-1 communications processor reportedly converts a Digital Equipment Corp. VT100-compatible terminal into a full-function IBM 3277-1, 3277-2, 3278-2 terminal communicating with the IBM host using the Binary Synchronous Communications protocol.

The communications processor reportedly performs full screen mapping; data displayed on an asynchronous Ascii terminal will be the same as an IBM 3277/3278 display station, with virtual screen sizes of 480, 960 and 1,920 characters, a vendor spokesman said.

The stand-alone processor provides two serial communications ports.

Priced at $1,495, the processor is available from the vendor at 4714 N.W. 165th St., Miami, Fla. 33014.

Terminal Emulator Out for IBM Micro

LOS ANGELES — Inner Loop Software, Inc. has introduced a terminal emulator for the IBM Personal Computer that reportedly allows the micro to be used in place of the Hewlett-Packard Co. HP 2624, the HP 2648 and the Digital Equipment Corp. VT52 video display terminals.

Video Display Terminal Emulator (VDTE) 2 reportedly features a general-purpose file transfer system that requires no special programming on most host computers to transfer Ascii files, according to a vendor spokesman.

VDTE 2 supports HP 2624B block mode for compatibility with most HP 3000 software and a subset of HP 2648A vector graphics plotting sequences, according to a spokesman for the vendor.

VDTE 2 is reportedly written in assembly language especially for the IBM Personal Computer. Both serial ports can be used, with seven pages of off-screen scrolling memory per port, a vendor spokesman said.

Priced at $200, VDTE 2 is available from Inner Loop Software, through P.O. Box 45857, Los Angeles, Calif. 90045.

NCR Comten Expands 7160 Series Modems

ST. PAUL, Minn. — NCR Comten, Inc. announced that it has expanded its 7160 series of IBM Systems Network Architecture (SNA)-compatible diagnostic modems with the introduction of the Comten 7165, a 9,600 bit/sec modem that is available in point-to-point and multipoint versions.

The modem is said to be fully synchronous, to operate over unconditioned, voice-grade lines in full-duplex mode and to feature built-in diagnostics and compatibility with IBM mainstream diagnostics.

NCR Comten said the modem uses digital signal processing for 98% of its functions, includng modulation, demodulation and dynamic equalization.

Available for shipment Sept. 15, unit prices start at $5,800, according to the vendor. NCR Comten is located at 2700 Snelling Ave. N., St. Paul, Minn. 55113.

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IBM Unveils Resource Manager

PORT CHESTER, N.Y. — IBM has announced the Resource Manager for its 4700 Finance Communication System.

The Resource Manager includes two programs providing a series of programming aids said to help reduce the time required to develop new applications and improve programmer productivity.

The programming aids include the Controller Resource Manager, which operates on the 4700 controller and manages the components of the branch system, including terminals, printers and storage files, and IBM's Application Map Generator.

Available in late December, the Controller Resource Manager carries a one-time charge of $1,300; the Application Map Generator has a one-time charge of $21,000. More information is available from IBM at 900 King St., Port Chester, N.Y. 10573.

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August 3, 1983

Modem System Boasts V.29 Compatibility

SILVER SPRING, Md. — Rixon, Inc. has introduced the RV.29/2 full-duplex, V.29-compatible synchronous 9,600 bit/sec point-to-point modem system.

The modem includes an integral line contender said to allow a single terminal or two adjacent terminals to share one 3002 unconditioned four-wire private line. Normally operating at 9,600 bit/sec, the modem can also operate at a fallback rate of 4,800 bit/sec.

The Rixon LSD-6C Line Saving Device can also be used with the modem for applications requiring more than two adjacent terminals.

The modem's front panel contains push buttons that permit testing of the modem, the terminal and the line, according to the vendor. The operating speed is also controlled by a push button.

Priced at $2,495, the modem is available from Rixon at 2120 Industrial Pkwy., Silver Spring, Md. 20904.

System Allows IBM Micro To Emulate Burroughs Unit

CINCINNATI — Intercomputer Communications Corp. has announced software said to allow the IBM Personal Computer to emulate the Burroughs Corp. MT983/TD830 terminal.

Intercom 100 reportedly supports up to six addresses simultaneously — four for concurrent operator dialogues or bidirectional file transfers and one for background printing. The additional address is reserved for future upgrade.

Other features include an on-line disk file transfer utility, data communications line monitor mode and data transfer rates from 50- to 9,600 bit/sec using the standard IBM asynchronous communications adapter or equivalent.

System requirements are one disk drive, at least 64K bytes of memory and an asynchronous card. Intercom 100 is available immediately on a 5¼-in. diskette at $99 per copy, with a 30-day money-back guarantee from Suite 2A, 3195 Linwood, Cincinnati, Ohio 45208.

Victor Offers Two Options As ECR Link

ATLANTA — Victor Technologies, Inc. has introduced two communications options to link the company's Vanguard Electronic Cash Registers (ECR) into a single retail system.

Both options are said to provide consolidation of totals and price changes — one by linking registers in a store to a master register, the other by linking them to a Victor 9000 desktop computer, according to a vendor spokesman.

The Inter-Terminal Communications (ITC) option is available to link up to 255 Vanguards to a single master vanguard, on up to 4,000 feet of cable. In addition, Vanguard ECRs can now also be linked to the Victor 9000 with a field upgrade, according to a vendor spokesman, allowing the Victor 9000 to poll information from up to 255 Vanguard units.

The price of the Victor 9000 starts at $3,495. For the function as a master to the registers, a Register Interface Board is required; this upgrade costs $350. As with the ITC option, each Vanguard on the network requires a utility board and hardware interface, priced at $300.

More information is available from Victor at 380 El Pueblo Road, Scotts Valley, Calif. 95066.

Bytronix Out With Mux

FULLERTON, Calif. — A dual-mode multiplexer providing up to 16 channels of I/O in standard Data General Corp. DG4060 or microprocessor-controlled direct memory access modes has been announced by Bytronix Corp.

The B108/B116 Maximux boards, the vendor said, are designed primarily for Bytronix or other DG-emulating computer systems.

Packaged on a 15- by 15-in. circuit board, the B108 provides eight channels of I/O multiplexer. The B116 expands to 16 channels; a second board may be added for expansion to 32 channels. Each channel has programmable bit/sec rates in 16 steps from 50 bit/sec to 19.2K bit/sec.

List prices are $1,945 for the B108 and $2,475 for the B116. Delivery time is said to be 30 days. Further information is available from Bytronix at 2701 E. Chapman Ave., Fullerton, Calif. 92631.

Facility Enables IBM Micros To Work With IBM CPUs

PHILADELPHIA — Cisinetwork Corp.'s Uni-Coll Corp. subsidiary has announced a software package said to enable IBM Personal Computers to upload and download data from an IBM mainframe.

Called C-N-Comm, the facility reportedly uses an error-checking protocol to assure data integrity during the transfer process. It can be installed in any IBM mainframe environment that supports MVS with TSO.

C-N-Comm runs on an IBM Personal Computer with 128K bytes of random-access memory, at least one single-sided disk drive and DOS Version 1.1 or 2.0.

The package is priced at $400 per copy. A fully paid license costs $5,000, including one year of maintenance, Uni-Coll said from 3401 Science Center, Philadelphia, Pa. 19104.

Aid Offers Networking For Micros

FALLS CHURCH, Va. — TAU Systems Corp. has announced software said to allow global networking of personal business computers using the telephone system.

A network based on I/O Express reportedly may include up to 149 remote computer stations within reach of the telephone system. The product is designed to overcome protocol incompatibilities at various sites, allowing micro-to-micro and micro-to-mainframe network configurations without hardware protocol conversion.

The product also offers a point-to-point protocol said to compress automatically data files prior to transmission, reducing telephone connection time. Other features include channel selector access to the remote station, automatic logon, menu-driven command selection and automatic batch file transfer.

I/O Express costs $395 per workstation and runs under Digital Research, Inc.'s CP/M operating system, a spokesman said from Suite 327, 7115 Leesburg Pike, Falls Church, Va. 22043.

Alarm Unit Out For IBM 3270s

EAST NORWALK, Conn. — Datacomm Management Science, Inc. has introduced an alarm unit that can reportedly be installed on any IBM 3270 or compatible CRT terminal or line printer to signal the arrival of urgent messages.

The AAD-8 Alarm Attachment Device reportedly produces an audible signal and activates an LED alert light when the system recognizes a preestablished character code in the incoming header, a vendor spokesman said.

At a cost of $500, the alarm system is available from Datacomm at 25 Van Zant St., East Norwalk, Conn. 06855.

From AT&T Information Systems

Com Key, Horizon Get Price Cuts

MORRISTOWN, N.J. — AT&T Information Systems, Inc., formerly American Bell, Inc., has announced a 20% price reduction on its Com Key 416 and Horizon VS communications systems.

The Com Key, designed for smaller businesses, is a key telephone system with a built-in loudspeaker that reportedly enables a system to handle up to four common lines and 16 stations.

The Horizon is a multi-button electronic telephone set that can reportedly handle up to 32 lines and 79 extensions simultaneously and includes three-way conferencing, call waiting and call transfer.

The price reduction amounts to a difference of some $560 on the average four- to six-station Com Key system, with a current purchase price of $2,800, and a reduction of about $3,800 on the average 10-line, 20-station Horizon VS system, with a new purchase price of $19,000, according to a spokesman for the vendor.

Additional information can be obtained from AT&T Information Systems through Box 1955, Morristown, N.J. 07960.

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BD02302

Northern Telecom's SL-1 Meeting Bank's Needs

(Continued from Page 65)

our computer terminals use ADMs, but more will in the future."

The ADMs are installed between the telephone set and the data terminal. In such a configuration, the user can make voice calls on the SL-1 electronic set and data communication transactions on the terminal individually or simultaneously.

The Bank's communications system is one of the most extensive in the country in terms of the features incorporated. It uses an automatic route selection program, call detail recording and tie lines to provide various member banks or affiliates access to long-distance services.

There is a high percentage of SL-1 electronic telephone sets using speed call, call forwarding, ring again and other productivity-enhancing features. These are features which only a few years ago were considered by many to be optional, but today are expected capabilities of an electronic PBX.

The data terminals connected via ADMs can also use many of these voice features. Services such as off-premise data centers can be accessed using speed call and busy lines can be queued against, using the ring again features.

With the SL-1 and ADM, if there is a phone jack at the new location, the telephone, terminal, and ADM are lugged into the new jack.

"We had a phased installation of the system over 24 months, and the ADM was available when needed," Holthus continued. "In April of 1982, we installed our first Hewlett-Packard 3000 data processing system in the financial planning department; another HP 3000 was installed in the data processing department in August."

"The communications system at First Bank is typical of a major company using the newest technology to answer and anticipate communication needs," said David Crawford, executive vice-president, Collins Communications. "Currently there are about 40 ADMs installed on the system. These handle asynchronous data transfers between the company's computer systems and terminals."

The SL-1/ADM system fits in well with First Bank's data processing applications. "Our holding company — First Bank Systems — does planning for all the affiliate banks in the company around the upper-Midwest five-state area," according to John Dewitt, a financial systems analyst at the bank. "The program development people are responsible for a variety of functions including profit center accounting. The financial planning group provides financial information and analytical help to other departments."

According to Anne Burkholder, a financial planning, officer the current SL-1/ADM system configuration is just the beginning of what will be done. "This year we will have microcomputers in some of the functional areas of the bank," she predicted.

"In fact, the trust department already has a microcomputer connected to the financial planning system via an ADM. These departments use a financial modeling program to take our basic planning numbers and adapt them to their particular needs," she said.

The ADM arrangement also adds reliability and faster response times to operations. If all terminals are hardwired to a computer and that computer goes off-line (for example, in the case of maintenance or program changes), those terminals remain out of service until the computer is again functional. On the other hand, terminal/ADM users can simply dial up another appropriate computer on or off premise.



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Kaypro Unveils Portable Micro With Networking

DEL MAR, Calif. — A portable computer with built-in networking capabilities has been announced by Kaypro Corp. here and Centram Systems, Inc., Camp Hill, Pa., developers of the Web networking system.

The Kaypro computer includes a 125K bit/sec Web transceiver and network interface. The networking software — OPSnet from Aquinas, Inc. — supports most Digital Research, Inc. CP/M 2.2 programs without modification, while supporting full network operations, a Kaypro spokesman said.

The cost of the networking option on the Kaypro will be $195. Systems may be configured using any combination of Kaypro II, Kaypro 4 or Kaypro 10, a 10M-byte hard disk machine that retails for $2,795.

Kaypro's address is P.O. Box N, Del Mar, Calif. 92014.

Cluster Device Supports Ascii to Non-IBM

SAN DIEGO, Calif. — Term-Tronics, Inc. has introduced its 3270-4 Interactive Cluster Control system, said to enhance support for Ascii communications to non-IBM-3270-oriented computers, minicomputers and microcomputers when used with the Term-Tronics 3270 X A/B display station.

The Model 3270-4 controller reportedly has the operating characteristics and capabilities of a 12-port IBM 3274-51C controller and reportedly supports IBM's Binary Synchronous Communications line protocols at speeds up to 9,600 bit/sec over dedicated lines.

The 3270-4 is designed to operate with the Term-Tronics 3278 or 3279 color display stations, according to a vendor spokesman.

Priced at $2,995, the controller is available from Term-Tronics at 7408 Trade St., San Diego, Calif. 92121.

GTE Telenet Uses Protocol

VIENNA, Va. — GTE Telenet Communications Corp.'s Telenet Public Data Network will now support direct transmissions between personal computers and host computers or other systems utilizing a communications protocol developed by Microcom, Inc. of Norwood, Mass.

The Microcom Networking Protocol is said to provide error-free data communications over a local dial-up telephone circuit linking a personal computer with the Telenet network.

Charges for usage of the Telenet network are in the range of $6/hour to $8/hour, compared with $25/hour to $30/hour for long-distance telephone service, which does not provide error detection/correction or protocol conversion, a GTE spokesman said. More information is available from GTE Telenet, located at 8229 Boone Blvd., Vienna, Va. 22180.

Translator Ties CPU to Ascii Units

YOUNGSTOWN, Ohio — A protocol translator said to give central computers the capability of communicating with all Ascii terminals without having to learn their languages has been introduced by Western Datacom Co.

The Datacom 1000 asynchronous protocol translator requires no additional peripheral equipment, and a full range of programming functions is internally converted to the nomenclature of the various computer manufacturers.

Attached to modem lines, the translator will request terminal type once the carrier is detected; when attached to dedicated lines, data lines are monitored for a specific control sequence to change terminal type.

The company has also introduced the Lineguard 3000 two-channel asynchronous dial-up security system. Within a 60-second sequence, the security device will request the caller's assigned code number, verify the number and ask the caller to hang up and await a call back that will then connect to the computer.

The Datacom 1000 is priced at $875, and the Lineguard 3000 at $945. More information is available from Western Datacom at 5083 Market St., Youngstown, Ohio 44512.

Modem Sharer Handles Four Units

CHAMPAIGN, Ill. — A modem-sharing unit said to allow up to four data communications terminals to share one modem has been announced by Compre Comm, Inc.

The MM-4 Modem Multiplier has a concatenation feature said to allow an increase in the number of terminals on one line through the connection of an additional MM-4 to one of the terminal ports of the other MM-4.

Each port has Request-to-Send and Clear-to-Send indicators to aid in network fault isolation, the vendor said.

The MM-4 costs $475 from Compre Comm through 3200 N. Farber Drive, P.O. Box 3570, Champaign, Ill. 61821.

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RTA-327II Measures Net Performance Level

EAST NORWALK, Conn. — A data collection instrument for measuring performance level and network efficiency of data communications networks has been announced by Datacomm Management Sciences, Inc.

The RTA-327II Response Time Analyzer is designed specifically for use with IBM's Binary Synchronous Communications and Systems Network Architecture/Synchronous Data Link Control protocols with IBM 3271, 3274, 3276 or equivalent terminals operating in the conversational mode, according to a spokesman for the vendor.

The device reportedly permits simultaneous measurements of user-perceived response time, host and polling delays, traffic loading and other parameters that impact overall system performance.

This data, according to the spokesman for the vendor, enables network managers to see and experience system responses and delays as a user would.

List price of the RTA-327II Response Time Analyzer is $4,875, the vendor said. Additional information can be obtained from Datacomm Management Sciences, located at 25 Van Zant St., East Norwalk, Conn. 06855.

ID Systems Graphics Terminal Out

HILLIARD, Ohio — A high-resolution graphics terminal said to offer dual-display architecture, National Television Standards Board compatibility and such features as zoom and pan has been announced by ID Systems Corp.

The ID-200 offers 1,280-by 480-pixel resolution with a display writing rate of up to 1.25M pixel/sec. The unit features 128 downloadable fonts said to enable users to create their own characters, in different languages if desired. Up to eight windows may be displayed simultaneously.

Said to feature "virtually infinite" color graphics patterns, the ID-200 has graphics command compatibility with most Tektronix, Inc. terminals, including Models 4010, 4014 and 4027. It has full Digital Equipment Corp. VT100 features and multipage editing compatible with DEC's VT132.

The ID-200 costs $4,000 from ID Systems, located at 4089 Leap Road, Hilliard, Ohio 43026.

FTC Announces Reductions For Leased-Channel Users

NEW YORK — A reduction in monthly rates for leased-channel users of its international communications services has been announced by FTC Communications, Inc. (FTC), effective immediately.

Private systems users of 50 bit/sec and 75 bit/sec telex services will experience a 55% rate reduction, the company said.

Rates of $1,000/mo, down from $1,600, are now in effect for Argentina, Austria, Belgium, Bermuda, Cameroon, Denmark, France, Germany, Ireland, Italy, Ivory Coast, Niger, Netherlands, Norway, Portugal, Saudi Arabia, Senegal, Sweden, Switzerland and the UK.

Rates of $1,000/mo, down from $2,200, are now in effect for Australia, Hong Kong, the Philippines and Singapore.

Further information is available from FTC at 90 John St., New York,, N.Y. 10038.

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Supports Up to 128 Users

Pyramid 32-Bit Mini Designed for Unix

MOUNTAIN VIEW, Calif. — A start-up minicomputer maker here has unwrapped a 32-bit, virtual memory minicomputer designed for the Unix operating system, including the Unix System V.

Pyramid Technology Corp.'s Pyramid 90x features the vendor's Xtend bus, a proprietary CPU featuring a 4K-byte high-speed instruction cache, an enhanced Unix operating system, a sophisticated memory hierarchy, intelligent I/O processors and the ability to support up to 128 users.

The system's proprietary three-board CPU executes instructions in two machine cycles and can be pipelined for further performance, the vendor said.

The synchronous Xtend bus has an open-end design that will allow future multiprocessor configurations and the integration of new technology. The bus reportedly has a 32M byte/sec bandwidth and accommodates the CPU; one to four memory modules holding 1M- to 2M bytes each; the System Support Processor (SSP); and multiple I/O processors, which allow for interfacing to peripherals, networks and adapters to other buses, including Intel Corp.'s Multibus.

Pyramid's ported version of System V (under license from Western Electric) incorporates enhancements made by the University of California at Berkeley and proprietary Pyramid 90x enhancements that automatically handle programs and data arrays that are larger than physical memory, the vendor said.

The 90x's physical memory space can range from 1M- to 8M bytes, and the memory hierarchy provides each Unix process with 4G bytes of virtual address space utilizing a 2K-byte page size for demand paging.

The SSP, including Motorola, Inc.'s 68000-based auxiliary computer, reportedly performs local and remote diagnostic and test functions for the system. The SSP is the operator console interface and can be used to monitor system operations, configure software, control I/O processors and report system errors.

All packaged systems include the Pyramid 90x computer with CPU, main memory, Xtend bus, disk subsystem, magnetic tape subsystem and line printer controller; the SSP with a local or remote terminal and floppy disk drive; one or more intelligent terminal processors, each providing 16 asynchronous RS-232C ports for user terminals or networking communications; Unix operating system, including utilities and C language with globally optimized code generator; and basic documentation.

Pyramid 90x ranges in price from $99,000 to about $300,000, depending upon system configuration. Pyramid Technology is located at 1295 Charleston Road, Mountain View, Calif. 94043.

Wanted: Mini Stories

Minicomputers and their makers are in for some stormy weather.

As microcomputer and small business system manufacturers rival the performance of the mini makers, users are holding off on their purchase decisions. Current mini users are turning their collars up to their machines in favor of the micro cyclone.

What can minicomputer firms do to keep current users and attract new ones? More importantly, how do users decide what type of machine is best for them?

In September, *Computerworld* will publish a Special Report. If you are a vendor or user that has a decided point of view about the advantages offered either by a mini or small business system, we would like to hear from you.

Contributors are requested to send typewritten articles, approximately five to eight double-spaced pages in length. Charts and other graphics are welcome. Contributions should be sent no later than Aug. 26 to Senior Editor Ed Scannell, *Computerworld*, 375 Cochitutate Road, Box 880, Framingham, Mass. 01701.

STC Expands 4305 Storage Capacity

LOUISVILLE, Colo. — Storage Technology Corp. has expanded the storage capacity of both models of its 4305 Optimizer Storage Subsystem used in high-performance I/O operations.

The features, which include IBM 3380 disk drive emulation on the 4305 Model 6, can be installed on existing 4305 devices at customer sites. Previously, the 4305 could emulate only IBM's 2305 fixed head drum units.

The enhanced 4305 Model 6, with the 3380 emulation feature, will offer up to 192M bytes of semiconductor storage. The subsystem can be configured with one or two controllers and up to eight storage modules.

The Model 6 costs from $105,290 for a single controller and single storage module unit with 12M bytes of memory to $763,475 for a two-controller configuration with eight storage modules and 192M bytes of memory, the vendor said.

The enhanced Model 3 is available now and provides users with up to 48M bytes of semiconductor storage with a single controller.

The Model 3 costs from $76,730 for a single controller and single storage module with 12M bytes of memory to $229,620 for the single controller and four storage modules with 48M bytes of memory, the vendor said from 2270 S. 88th St., Louisville, Colo. 80028.

Pharmaceutical Testing Firm Cuts Costs With Supermini

BERLIN — A subsidiary built around a superminicomputer has helped a pharmaceutical testing company here to speed processing and cut the costs of computer analysis.

Arzneimittelforschung Berlin (AFB) collects clinical data on new drugs for pharmaceutical companies that have already completed the initial laboratory testing of new drugs themselves. AFB provides the last reaction testing before a new drug is licensed. Testing falls primarily into two areas: electrophysiological, with data collected from electroencephalographs (EEG) showing results on the central nervous system, and behavioral, using psychoexperimental models, performance tests and standardized rating scales.

AFB is currently composed of three companies: International Drug Experts Associates (Idea), Gesellschaft fur Arzneimittelprufung (GFA) and Comstat (Computation and Statistics).

In 1981, company officials realized that reliance on outside services for its computer analysis was expensive, time-consuming and not suited to AFB's requirements. Recognizing the need for in-house data processing and analysis facilities, three enterprising employees formed a new company under the AFB umbrella that year. Comstat was created around a Harris Corp. Harris 80 superminicomputer system, and its basic tasks included the development of application software, input data programs, the establishment of algorithms and models and the development of other tailor-made software programs.

Comstat's Harris 80 has 768K bytes of real memory, 6M bytes of virtual memory, two 80M-byte Winchester disk drives, two magnetic tape drives, six interactive terminals with special keyboards for APL and an electrostatic printer/plotter. Future system plans include connecting graphics terminals

(Continued on Page 76)

Turnkey Aims At CAD/CAM, Said to Cost Less to Own

By Jeffry Beeler
CW West Coast Bureau

PALO ALTO, Calif. — A two-year-old supplier of computer-aided design and manufacturing (CAD/CAM) aids has added hardware to its existing application software to produce a turnkey system that reportedly costs three times less to own than competing products.

Aimed exclusively at the mechanical CAD/CAM sector, Cadlinc, Inc.'s Computer-Integrated Manufacturing (CIM) Network marks the company's debut as a hardware and systems vendor. Prior to CIM Net's debut, the company's only products were a series of CAD/CAM application packages.

At the system's heart is a personal engineering workstation built around a 16/32-bit Motorola, Inc. 68000 microprocessor, according to a company official. Up to 1,000 of the workstations can be tied together through Xerox Corp. Ethernet networking protocols that allow users in one design or manufacturing area to share data and exchange files with colleagues in other areas.

Each CIM Net console costs roughly $8 per hour to operate. With competing CAD/CAM systems, by con-

(Continued on Page 76)

Personal CAD System Combines Turnkeys

IRVINE, Calif. — Manufacturing and Consulting Services, Inc. (MCS) has introduced a full-featured personal computer-aided design (CAD) system said to be a turnkey combination of its Anvil-3000D advanced interactive drafting system, Data General Corp.'s Desktop Generation 16-bit computer line and Tektronix, Inc.'s 4107 color terminal.

Jointly announced with the Desktop Generation line, the single-user system reportedly combines the Anvil-3000D CAD software package and Workplane Tablet with several overlays, the DG desktop engineering computer system with a 15M-byte hard disk drive and a floppy disk drive, the Tektronix 4107 color terminal, including 640 by 480 displayable matrix and tilt/swivel adjustable stand, with a Tektronix color ink-jet printer/plotter as standard equipment.

System options include a solid oak desk with the system for $1,500, a Tektronix 4114 or 4115 high-resolution display and a high-performance Hewlett-Packard Co. D- or E-size plotter.

The turnkey CAD system is priced at $38,500 in single-quantity purchases. MCS is located at 17942 Cowan, Irvine, Calif. 92714.

Solid-State Disk Emulator Boasts Drive Replacement

EL SEGUNDO, Calif. — Imperial Technology, Inc. has announced a solid-state nonrotating disk emulator system called the Megaram-7000, said to be a direct replacement for Digital Development Corp., Data Flux and Vermont Research rotating fixed-head disk drives.

The Megaram-7000 reportedly accommodates a variety of different drive formats and capacities and is both hardware- and software-equivalent to the drives it replaces, according to a spokesman for Imperial Technology.

The system features 10M bytes in a 7-in. chassis expandable to 16M bytes, battery backup option, full error detection and correction, high reliability and ease of maintenance, the spokesman said.

The storage system is contained in three subassemblies. The 2M-byte version of Megaram-7000 costs $16,600, according to the vendor spokesman.

Additional information on Megaram-7000 is available from Imperial Technology, which is located at 831 S. Douglas St., El Segundo, Calif. 90245.

3M Trendcom Unwraps Line Of Printers

SUNNYVALE, Calif. — A line of portable thermal printers has been unwrapped by 3M Trendcom, Inc.

The Models 150 and 151 employ a 4½-in. carriage for 40-col printing and 80-col compressed printing. Models 250 and 251 have an 8½-in. carriage said to accommodate 80-col applications and 136-col compressed printing.

All four models are equipped with a standard 2,048-char. buffer, and microprocessor control enables bidirectional look-ahead printing, a vendor spokesman said.

Model 150 with RS-232 serial interface costs $259; Model 151 with parallel interface costs $249; Model 250 with RS-232 serial interface costs $299; and Model 251 with parallel interface costs $289.

More information is available from 3M Trendcom, located at 480 Oakmead Pkwy., Sunnyvale, Calif. 94086.

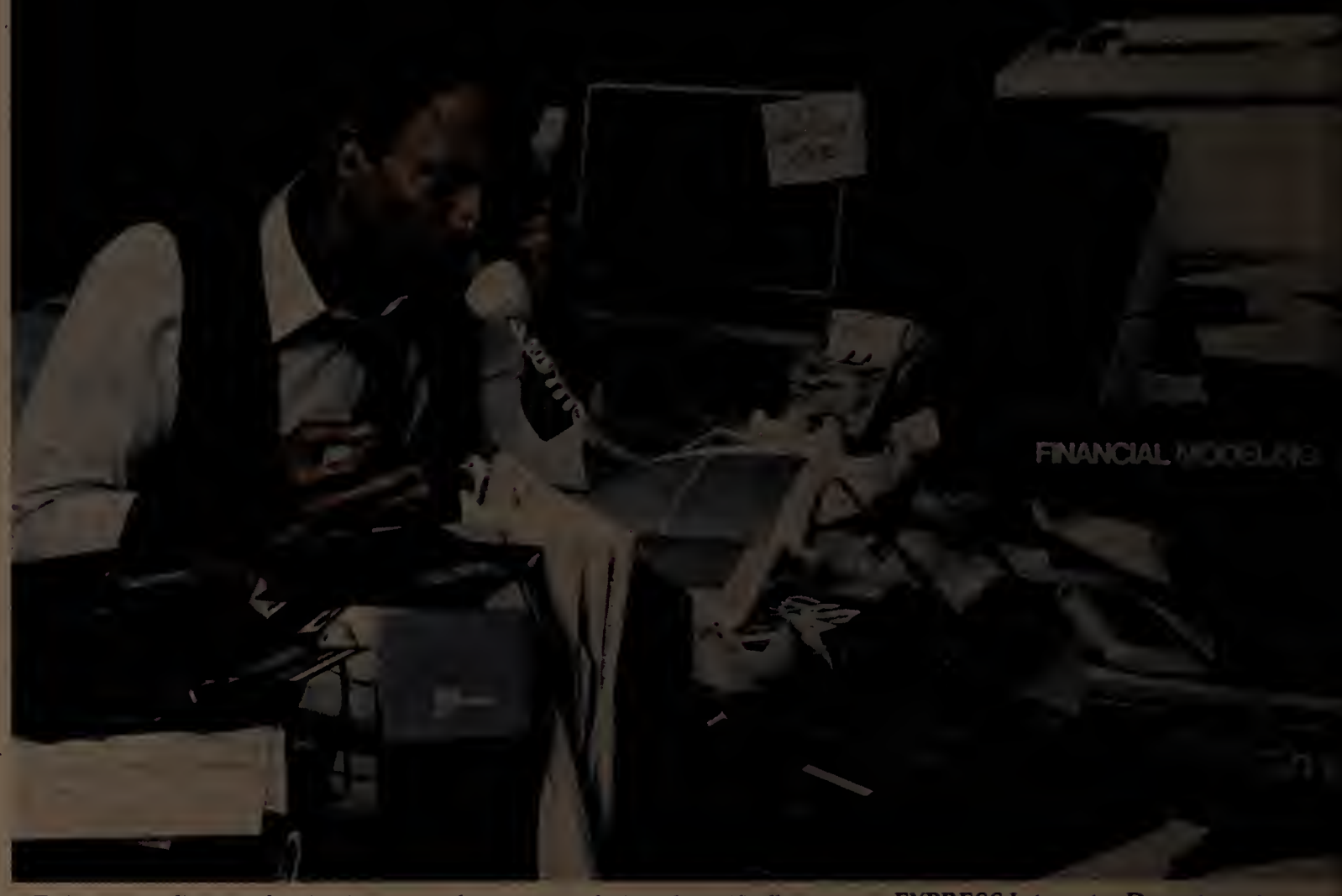
Companion Drives Out for Micromate

MOUNTAIN VIEW, Calif. — Personal Microcomputers, Inc. has announced two companion disk drives for its Micromate microcomputer.

A double-sided, double-density, dual disk drive offering 400K bytes of storage per disk costs $895, according to a spokesman for the vendor. A 10M-byte, half-height Winchester hard disk drive costs $1,995.

Personal Microcomputers is located at 475 Ellis St., Mountain View, Calif. 94043.

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Daisywheel Printer Outputs Machine-Readable Copy

SAN DIEGO — The Troy Division of Data Card Corp. has announced a medium-speed daisywheel character printer for local and remote-site generation of machine-readable financial documents.

Called the Remote Office Imprinter (ROI), the unit is equipped with magnetic ink character recognition capabilities. The unit also produces optical character recognition and alphanumeric characters, the vendor said.

The ROI can handle distributed printing of such documents as insurance claims, explanations of benefits, payrolls, dividends, refunds, preauthorization and exception checks, questionnaires, bond dividends and tax statements, the vendor said.

The ROI costs $12,000, Data Card said from 2331 S. Pullman St., Santa Ana, Calif. 92705.

Printers, Modems Debut

SCOTTS VALLEY, Calif. — Victor Technologies, Inc. has added two printers and three modems to its line of office automation products.

Added to Victor's line of dot matrix printers are the Models 6015 and 6025. The Victor 6015 uses cut sheet roll paper or fanfold paper up to 10 inches wide. The Victor 6025 can use the same paper up to 16 inches wide. Both printers can produce an original and up to two copies at a rate of 160 char./sec. The units feature a full 9-char. Ascii set with descenders plus numerous international character sets. The printers cost $925 and $1,160, respectively, the vendor said.

Also announced was a line of modems. The Victor 6260, 6261 and 6262 are fully Bell-compatible and registered with the Federal Communications Commission. The 6261 has a 1,200 bit/sec capacity. The 6262 supports transmission speeds from 0- to 300- and 1,200 bit/sec, the vendor said. Each of the modems operate on an RS-232C interface, and they cost $245, $495 and $695, respectively, the vendor said.

Victor is located at 380 El Pueblo Road, Scotts Valley, Calif. 95066.

HP Unwraps Six-Pen Plotter, Cuts Other's Prices

PALO ALTO, Calif. — Hewlett-Packard Co. has announced the HP 7475A, a six-pen graphics plotter. At the same time, the firm lowered prices on the two-pen GP 7470A by 30%. Both plotters can be used with microcomputers made by IBM, Apple Computer, Inc. and Digital Equipment Corp.

The HP 7475A accepts both 11- by 17-in. and 8½- by 11-in. paper plus overhead transparency film. With its six-pen carousel, the plotter produces multicolor pie, bar, line and text charts with a line resolution as fine as 0.001 in., the vendor said.

Plot speed on the 7475A is 15 in./sec with a 2g acceleration. The unit costs $1,895, the vendor said.

The price on the two-pen 7470A is $1,095. More information is available from the Inquiries Manager, HP, 1820 Embarcadero Road, Palo Alto, Calif. 94303.

DEC Book Series Covers Micros For Users

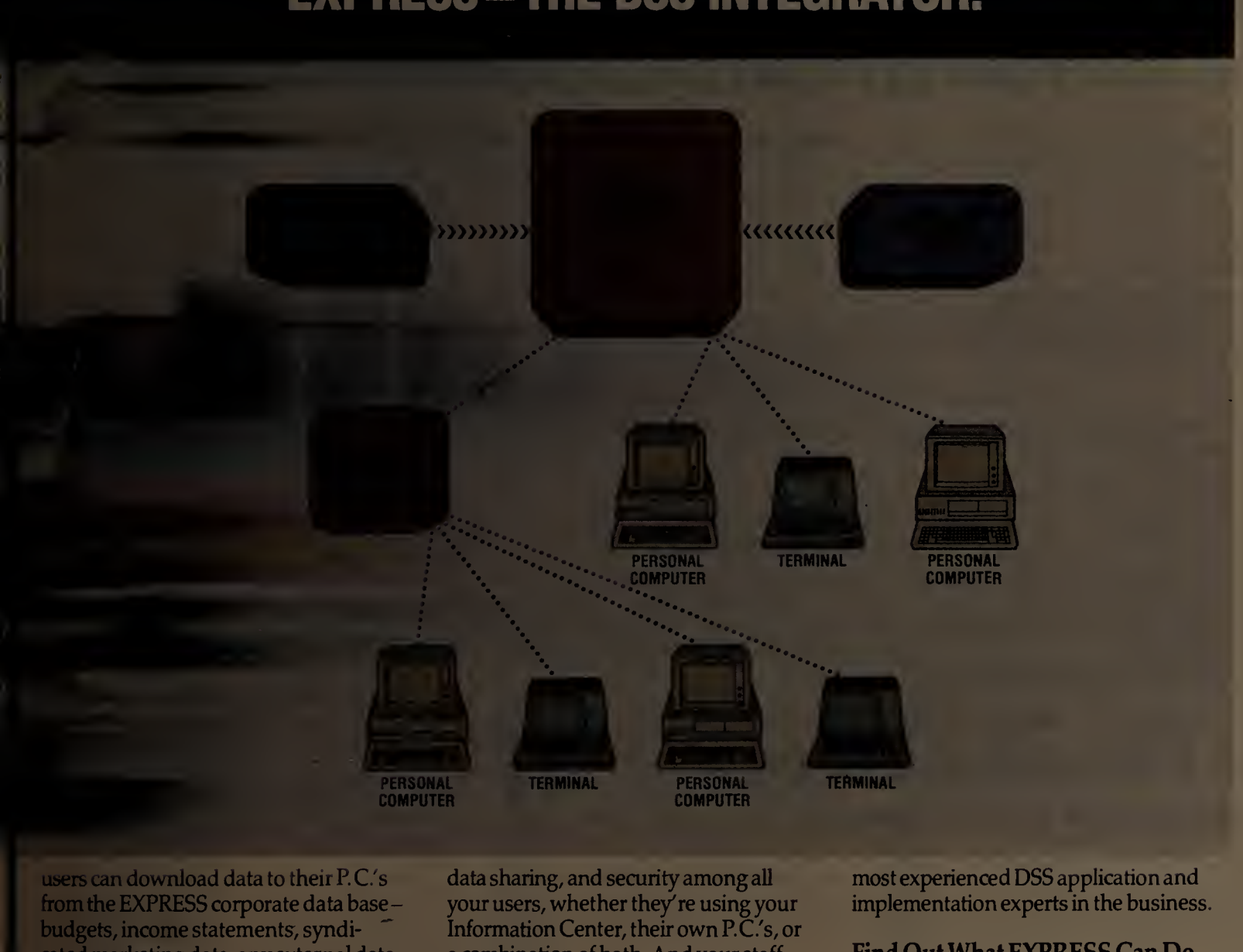
BEDFORD, Mass. — Digital Press, Digital Equipment Corp.'s in-house publishing group, has released a series of books called "Desktop Computer Series," which centers on the issues of personal computers in business.

Approximately 20 titles will be included in the series over the next two years, the vendor said. The initial book, "Your First Business Computer," will be followed by titles that will focus on personal computers in a corporate environment, management applications of personal computers and specific professional applications such as law, medicine and engineering.

Books in the series differ from other Digital Press publications because they address the needs of computer users, not professionals; are planned as a series; and are available through book trade channels as well as direct mail, the vendor spokesman said.

"Your First Business Computer" costs $15, from Digital Press, 12 Crosby Drive, Bedford, Mass. 01730.

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Management Decision Systems, Inc.

Supermini Boosts Drug Tester's Efficiency

(Continued from Page 73)
to enable Comstat to produce three-dimensional pictures of the spectrum of data. Also, a special interface to a real-time processing peripheral device provides a direct link from the EEG to the Harris 80, allowing direct entry and direct feedback. This interactive feature, which saves AFB both time and money, would be impossible if the computing was done by an outside company, according to Harris Corp.

"Computers like our Harris 80 are a prerequisite when you consider the enormous amounts of data we gather," Dr. Werner M. Herrmann, an AFB official, said, adding "We must have easy data handling and a relatively large core memory to be able to process [our] tremendous amounts of data."

The superminicomputer enables AFB to do a complete analysis with all the multivariate statistics that are in use, including methodologies such as factor, cluster or discriminate analysis.

Comstat develops all its own software, since currently there are no packages on the market that conform to its needs, particularly in the graphics area. "Every problem we face is a new one," stated Comstat cofounder Joachim Willmann. Approximately two-thirds of Comstat's work is done in APL. The remainder utilizes Fortran. Comstat's end product is a statistical study of the trial. It may include EEG profiles, dose- and time-effect curves, graphs and tables after data reduction, according to the requirements of the trial and the request of the customer.

"All in all, we think the Harris computer offers us the best price/performance ratio, especially in APL. We also recognize the growth possibilities available to us with the Harris 80," Willman concluded.

Voice Board Announced For Apple

SAN FRANCISCO — Voice Recognition Systems is offering an Apple Computer, Inc.-compatible voice recognition board said to allow users to input commands and repetitive data by speaking into a microphone.

Providing voice recognition signal processing algorithms, the Apple Voice Input Module (Avim) receives the user's verbal commands, recognizes them and then responds with any sequence of keystrokes users require. Its resident memory of 8K bytes can store up to 80 voice-command/keyboard-response sets at one time; other commands can be stored on disk and accessed in seconds, a spokesman noted.

A comprehensive menu-driven utility program reportedly allows users to create command sets and train them to recognize the user's voice. Avim will input any Apple-compatible program with no software modifications and operates as a keyboard emulator rather than a peripheral device operating through an RS-232 port.

Complete turnkey systems, including the Apple IIe computer, are available. The add-on system for the Apple II+, IIe and Apple-compatible systems is priced at $995. An adapter for the Apple IIe is an additional $75. Voice Recognition Systems is located at 550 Battery St., San Francisco, Calif. 94111.

CIM Network Designed For Mechanical CAD/CAM

(Continued from Page 73)
trast, the console-per-hour ownership cost averages $23 to $25, the official said.

Cadlinc partly attributes the threefold cut in ownership expense to the 68000's superior price/performance and to steadily decreasing memory costs in the semiconductor industry.

In an effort to make the system easy to use, Cadlinc has equipped CIM Net with user-interface features reminiscent of Apple Computer, Inc.'s Lisa. The CAD/CAM product, for example, comes with predefined menus, the ability to display multiple screens simultaneously, a cursor-positioning mouse and Lisa-like icons that pictorially represent familiar user functions.

In addition to the 68000-based workstations, CIM Net boasts a series of CAD/CAM-oriented application packages that support tasks like multidimensional design, surface modeling and two-dimensional detailing and drafting. The system also comes with a networking application package that reportedly provides a communications interface to installed CAD/CAM products from competing vendors.

To ensure that users of other CAD/CAM offerings can transport their existing software to CIM Net, Cadlinc has built its product around the Unix operating system, the official explained.

In a fully networked configuration, CIM Net costs $35,000 per workstation and is available from Cadlinc at 1872 Brummel, Elk Grove, Ill. 60007.

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A seminar on IDMS/R.



Seminars on Cullinet's relational database management system, IDMS/R, will be held in the following cities during the next few weeks.

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Augusta, GA	September 1
Austin, TX	September 15
Boston, MA	September 20
Calgary, ALTA	September 15
Charlotte, NC	September 22
Chicago, IL	September 7
Cincinnati, OH	September 12
Cleveland, OH	September 19
Columbus, OH	September 9
Dallas, TX	September 7
Des Moines, IA	September 28
Eau Claire, WI	September 21
Evansville, IN	September 27
Grand Rapids, MI	September 15
Hartford, CT	September 14
Houston, TX	September 29
Indianapolis, IN	September 20
Jacksonville, FL	September 29
Kansas City, MO	September 22
Lexington, MA	September 7
Los Angeles, CA	September 21
Louisville, KY	September 7
Memphis, TN	September 20
Miami, FL	September 29
Milwaukee, WI	September 13
Minneapolis, MN	September 8
Montreal, QUE. (Eng.)	September 14
Montreal, QUE. (Fr.)	September 15
Nashville, TN	September 13
New Orleans, LA	September 29
New York, NY	September 21
New York/Long Island, NY	September 13
New York/Rye, NY	September 7
Norfolk, VA	September 28
Omaha, NE	September 29
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Salt Lake City, UT	September 27
San Diego, CA	September 13
San Francisco, CA	September 15
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Southfield, MI	September 15
Toledo, OH	September 27
Toronto, ONT	September 20
Tucson, AZ	September 28
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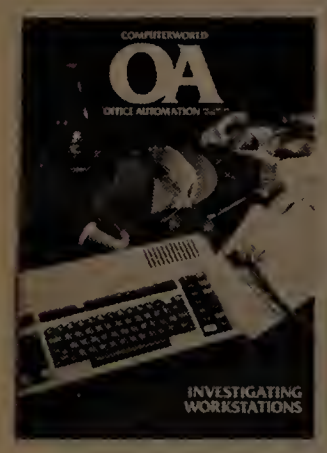
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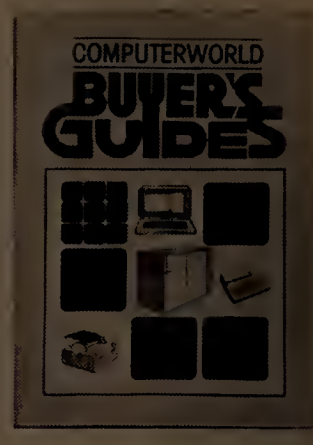


Every two months, *Computerworld OA* gives you a detailed, thoughtful look at all the happenings in Office Automation. Each issue examines a particular area of OA, giving you a complete overview of the state of the art in that area and other aspects of OA. Recent issues have examined overall OA planning Strategies, Workstations, OA Software, Personal Computers, and Management Support Systems.



Our newest publication does for communications what OA does for Office Automation. *Computerworld on Communications* covers the fast-merging worlds of computers and communications with in-depth articles on important trends and current topics. Subjects which have been or are scheduled to be covered in *CW on Communications* in its two 1983 issues include: Voice and Data Communications, Local Area Networks, Communicating Personal Computers, Local Loops, Convergent Technologies, and Telecommunications Management.

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1. BUSINESS/INDUSTRY (Circle one)

End Users
- 10 Manufacturer (other than computer)
- 20 Finance/Insurance/Real Estate
- 30 Medicine/Law/Education
- 40 Wholesale/Retail Trade
- 50 Business Service (except DP)
- 60 Government-State/Federal/Local
- 65 Public Utility/Communication Systems/Transportation
- 70 Mining/Construction/Petroleum/Refining
- 75 Other User_____

Vendors
- 80 Manufacturer of Computers, Computer-related Systems or Peripherals
- 85 Computer Service Bureau/Software/Planning/Consulting
- 90 Computer/Peripheral Dealer/Distributor/Retailer
- 95 Other Vendor_____

2. OCCUPATION/FUNCTION (Circle one)
- 11 President/Owner/Partner/General Manager
- 12 VP/Assistant VP
- 13 Treasurer/Controller/Financial Officer
- 21 Director/Manager/Supervisor DP/MIS Services
- 22 Director/Manager of Operations/Planning/ Administrative Service
- 23 Systems Manager/Systems Analyst
- 31 Manager/Supervisor Programming
- 32 Programmer/Methods Analyst
- 35 OA/WP Director/Manager/Supervisor
- 38 Data Comm Network/Systems Mgmt
- 41 Engr/Scientific/R&D/Tech Mgmt
- 51 Mfg Sales Reps/Sales/Marketing Mgmt
- 60 Consulting Mgmt
- 70 Medical/Legal/Accounting Mgmt
- 80 Educator/Journalist/Librarian/Student
- 90 Other_____

3. COMPUTER INVOLVEMENT (Circle all that apply)

Types of equipment with which you are personally involved either as user, vendor or consultant
- A. Mainframes/Superminis
- B. Minicomputers/Small Business Computers
- C. Microcomputers/Desktops
- D. Communications Systems
- E. Office Automation Systems

Wang Adds Net Components, VS 24, 45 Add-Ons

LOWELL, Mass. — Wang Laboratories, Inc. has enhanced its local-area networking capabilities with two networking components. It also announced the availability of its VS 24 and VS 45 systems packaged with various add-ons.

The Wangnet Technical Control and Management System (TCMS) is an integrated set of network monitoring, diagnostic testing and information management tools.

Operating on a dedicated Wang VS minicomputer, TCMS is said to compile information about the location, status and performance of every component in the network. TCMS costs $7,500, with shipments starting in August.

The Wangnet Cmux-3270 Cable Multiplexer is an interface device linking IBM 3270 peripherals with an IBM 3274 Control Unit (category A interface) over the Wangnet local-area network.

The unit is said to allow users to utilize Wangnet as a single transmission medium, thus eliminating point-to-point coaxial cables between control units and attached devices. The Cmux-3270, available next January, costs $3,375.

Also announced by Wang is the availability of VS 25 and VS 45 packaged with various add-ons such as workstations compilers, tape cartridge drives or disk cables.

The two VS 25 packaged systems are priced at $25,000 and $34,000, with respective monthly maintenance charges of $200 and $297. The three VS 45 packaged systems are priced at $48,000, $53,000 and $63,000, with monthly maintenance fees of $396, $498 and $557, respectively.

Wang is located at One Industrial Ave., Lowell, Mass. 01851.



Third-party terminal emulation software allows the IBM Personal Computer to run on Interlan's Ethernet-compatible network.

Interlan Net System Meets Ethernet, IEEE Standards

By Jim Bartimo
CW Staff

BOSTON — Interlan, Inc. has introduced a networking system and terminal server that meet the Xerox Corp. Ethernet and IEEE-802.3 local-area network standards. Also announced was third-party terminal emulation software said to allow 12 types of personal computers to work on Interlan's network.

The Net/Plus networking system offers communications for host-to-host, terminal-to-host, device-to-device, personal computer-to-personal computer, personal computer-to-host and personal computer-to-device applications. The network can function in concert with an Ethernet local network.

This capability is achieved through the use of the NTS10 Terminal Server, which can be used for port switching, port contention, resource sharing, personal computer networking and simplified wiring for dispersed terminals and printers.

The NTS10 contains either four or eight ports and can be daisy chained to share a common transceiver unit connected to the Ethernet local-area network. For network security, the terminal server offers programmable passwords said to protect against unauthorized connections to a networked device and unauthorized reconfiguration of an NTS10 port.

The terminal server is available for $3,200 for the eight-port unit and $2,500 for the four-port unit.

Also announced was file transfer and terminal emulation software available for 12 different personal computers, two microcomputer development systems and four host minicomputers. By attaching a personal computer's RS-232C communications port to one of the ports on an NTS10, the user can access a variety of resources on Ethernet, a vendor spokesman said.

Developed by Polygon Associates of Mayland Heights, Mo., the networking software includes the Poly-TRM Terminal Emulation and Poly-XFR File Transfer packages.

The Poly-TRM software converts a personal computer into a terminal for use on the network. The Poly-XFR provides transfer of binary and Ascii files over Ethernet. The software ranges in price from $150 to $200 per personal computer and is available for machines from Apple Computer, Inc., Digital Equipment Corp., IBM, Radio Shack and others.

All Net/Plus products will be available in September from Interlan, 3 Lyberty Way, Westford, Mass. 01886.

Data Net Links IBM Equipment

ORANGE, Calif. — CR Computer Systems has announced a local- and wide-area data communications network said to link IBM mainframes with the IBM 3278 synchronous terminal, IBM 3279 color graphics terminal, Digital Equipment Corp. VT100-compatible RS-232C standard synchronous terminal and the IBM Personal Computer and Personal Computer XT.

X-Net, the local networking system said to eliminate the need for IBM's 3274 and 3276 cluster controllers, has reportedly been enhanced to connect IBM hosts — including the IBM 4300, 30 series and 370, with DEC VAX-11, PDP-11 and non-plug-compatible mainframes.

Designed to link from 50 to 50,000 terminals, minis, peripherals and mainframes into a single shared system, X-Net is said to allow users to expand a computer system with a bus-based, single cable.

X-Net costs about $1,000 per connection from CR Computer Systems, 1145 W. Collins Ave., Orange, Calif. 92667.

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Let's face it. You, as a DP/MIS professional, are responsible for building the Corporate Information Systems of the future. And because of that responsibility you are increasingly involved with decisions that affect the communications capabilities of your organization. You'll have to analyze products, services, and technologies and combine them to build a communications network that will move voice and data within your site as well as throughout the world.

It's because of this new convergence of two technologies that *Computerworld* now introduces *Computerworld on Communications*. In this issue and future issues we'll cover the entire spectrum of communication issues. We promise to deliver information on communications that is in-depth, analytical and tutorial in style. And we also promise to deliver the leading experts and strategists to help you understand the rapid advances in communications technology that are being made. *Computerworld on Communications* will take a holistic, "big picture" approach that will help you to understand the broader issues that you face as a business communications user.

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Look for the next issue of *Computerworld On Communications* on September 28. Advertising space close is August 19. For more information call Don Fagan, VP Sales/Marketing, toll-free at 800-343-6474 (in Mass. 617-879-0700) or your local *Computerworld* representative.

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Says Act Discriminates Against U.S. Exporters

AEA Pushes Congress to Streamline EAA

By Robert Batt
CW West Coast Bureau

The American Electronics Association (AEA) has begun an intensive lobbying effort to persuade Congress to streamline the current Export Administration Act (EAA), which it claims is unfairly hampering U.S. technology shipments to allied countries.

In a recent bulletin sent to 2,300 chief executives in the computer and electronics industry, the AEA urged member companies to write to their congressmen in support of new export bills currently before the Senate and House of Representatives.

The current act, designed to prevent the export of sensitive technology to Soviet bloc countries, expires Sept. 30 and must be amended or extended before then.

Characterizing the EAA as "inefficient and discriminating against U.S. exporters in competition with companies in other Western nations," the AEA said no single law has complicated and constrained exports of U.S. high-technology products more than the current legislation.

'[The Export Administration Act is] inefficient and discriminating against U.S. exporters in competition with companies in other Western nations.' — American Electronics Association bulletin

"Too many shipments to free-world customers are controlled. Too many items are embargoed by the U.S. unilaterally, thereby handing our aggressive competitors in Japan and Western Europe additional markets and the jobs they might have generated in the U.S.," the AEA told industry executives.

According to the AEA, the bill currently before the House of Representatives (H.R. 3231) will streamline licensing procedures to make exporting easier and use scarce export control resources more efficiently. The Senate bill, sponsored by Sen. Jake Garn (R-Utah) and Sen. John Heinz (R-Pa.), also offers an improvement over the current law, the association asserted.

However, the AEA added, the Senate proposal is flawed in that it gives too much discretionary power to the Secretary of Defense to review exports. This, the AEA claims, has the potential for significant new delays and uncertainty in trading among the Western nations.

"We are not trying to scuttle legitimate security issues. Our thrust is to focus export controls on truly critical items and streamline control procedures, thereby strengthening both our national security and making exporting of legal items easier," explained Ralph Thomson, AEA vice-president, in an interview here.

While support for the bills in Congress appears to be gaining momentum, it is by no means certain that the Reagan administration will go along with the proposed amendments.

Assistant Defense Secretary Richard Perle said recently that the government will veto "a bad bill," one that does not adequately protect U.S. security interests.

Loren Sorensen, chairman of the AEA international committee, retorted that the current act is costing U.S. computer companies not only lost sales, but also future markets in the West.

"We are not talking about military sales; we are talking about dual-purpose items such as computers," Sorenson said. "The problem is that the Department of Defense wants to control everything and not allow anything out of the country that could be used other than commercially."



CW File Photo

Adam Osborne stared from behind the Osborne 1 when it was introduced in 1981. Of the five Osborne employees who flanked their boss in this picture, only one, Lee Felsenstein, second from left, still remains at the company.

Fierce Competition Forces Layoffs, Price Cuts at Osborne

By Patricia Keefe
CW Staff

"It's probably the result of the industry's moving so fast that the people and their businesses don't have time to mature before the next wave comes along. Many of them won't survive . . ." — Adam Osborne, commenting on the microcomputer market in the Nov. 17, 1982 issue of Computerworld Extra!

HAYWARD, Calif. — Sluggish sales and fierce competition in the portable computer market have forced Osborne Computer Corp. to fight back with a $700 price cut on the Osborne 1, the closing of its New Jersey plant and the layoff of at least 294 employees.

Despite Osborne's optimism in the face of rumors concerning its financial health, one industry analyst believes the company "is temporarily on the skids." Osborne, according to Chris Christiansen of The Yankee Group, a Boston-based market research firm, "will never regain its place as the industry leader," having lost considerable market share to competitors such as Kaypro, Inc.

Christiansen said that in addition to a recent announcement concerning the rescheduling of its debt, it was believed that Osborne "did not make any money in April" and was operating in the red as recently as June. Also, in a July 5th letter to its creditors, Osborne reportedly said that full payment of accounts payable would be delayed one month because of its "current tight cash position." However, company officials expect a new round of private financing, estimated at $20 million, to improve the portable computer maker's cash flow picture.

But signs of trouble are persisting. Less than a year and a half after its opening, Osborne closed its Monmouth Junction, N.J., manufacturing plant Aug. 2, laying off about 89 employees "with no recall," a

(Continued on Page 84)

Harris Acquisition Of Lanier Raising Sales, Tech Issues

By Bill Laberis
CW Staff

NEW YORK — The proposed acquisition of Lanier Business Products, Inc. by Harris Corp., announced last month, raises two questions: How well can the products of the two companies be integrated into the same environment, and can two very different sales forces achieve synergism in marketing automated office equipment?

The first question will be answered in the laboratory, where Harris will use its communications expertise in attempting to link its large systems with Lanier's stand-alone terminals and other office automation products.

The second question was posed in a variety of ways by security analysts here recently, who pressed Harris Chairman Joseph A. Boyd for answers regarding the compatibility of the sales teams of each company.

To date, the investment community has given the proposed acquisition anything but a vote of confidence. Harris stock was trading for $48 per share prior to the July 22 announcement, but was nudging the $38 mark early last week, having dropped 20% since the announcement.

Boyd attempted to allay Wall Street's anxiety, telling the analysts that "for a year, maybe two," Lanier will operate as a relatively autonomous fifth sector of the Harris organization. Harris, he said, does not want to upset the "very, very fragile things" that characterize the differences

(Continued on Page 91)

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Fueled by Investment Rates

Japanese Chip Sales to Grow 18%

By Robert Batt
CW West Coast Bureau

MOUNTAIN VIEW, Calif. — Japanese semiconductor sales, fueled by above average rates of investment, will grow by 18% a year over the next three years, reaching $84.4 billion by 1986.

This is the major conclusion of a report just released by the Semiconductor Equipment and Materials Institute, Inc. (Semi).

The 460-page "Japanese Semiconductor Industry Report," prepared for Semi by the Nomura Research Institute in Kanagawa, Japan, said that Texas Instruments, Inc. and Motorola, Inc. are the only U.S. chip manufacturers to have made any impact in the Japanese market.

At the same time, the report stated, overseas manufacturers can expect increased competition from Japanese semiconductor firms. "While 90% of the current total output of Japan-based semiconductor manufacturers is produced within the country, this ratio will gradually decrease, not only to prevent trade friction with advanced countries, but also to promote market development in advanced countries through closer contacts with customers," the report said.

Japanese integrated circuit (IC) exports to the U.S. rose 67% in the first half of 1983, compared with the same period last year, according to figures just released by the Japan Finance Ministry.

Total IC exports to the U.S. in the same period were at $327 million, while Japan's IC imports from the U.S. increased 17% to $188 million, the ministry said.

The top Japanese semiconductor manufacturers, like Nippon Electric Co. (NEC), Hitachi Ltd., Toshiba Corp. and Fujitsu Ltd., are actively promoting overseas production, chiefly in the U.S. and Southeast Asian countries.

Together with Mitsubishi Corp., these Japanese companies have combined annual sales of more than $4.7 billion, which has allowed them to invest heavily in semiconductor research and development, the report noted.

Much advanced equipment was developed through cooperative research efforts with either major manufacturers or government organizations, the report continued. "This research contributed greatly to the advancement of semiconductor production technology boosting Japanese equipment competitively," the report added.

The Japanese Semiconductor Industry Report is available for $495 for members and $895 for nonmembers from Semi, Suite 212, 625 Ellis St., Mountain View, Calif 94043.



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Computervision Inks Remarketer Pact With IBM

BEDFORD, Mass. — Computervision Corp. last week announced the signing of a pact whereby the company will order IBM-made software and hardware for integration into its computer-aided design and manufacturing (CAD/CAM) systems. Computervision and IBM are numbers one and two, respectively, in CAD/CAM system sales.

The agreement is a remarketer contract requiring Computervision to add significant value in software, hardware or both before selling to end users, the company stated. .

The announcement follows acquisitions made by Computervision in the past several months, including Cambridge Interactive Systems of the UK, Grado of West Germany and the Organization for Industrial Research of Waltham, Mass.

The acquisitions and recent announcement will result in a new family of products for Computervision, the company claimed, including its Computervision Distributed System 4000 CAD/CAM system, a 32-bit turnkey system also announced last week and slated for delivery in September.

James Berrett, Computervision president, said the deal with IBM was struck "because of the unquestioned quality and capacity of [its] information management products.

"The significance of the announcement lies not in the contractual details, but in the fact that IBM will provide key product elements for our expanding market," he explained.

Slow Sales Force Osborne To Cut Prices, Close Plant

(Continued from Page 81)

spokesman for the plant said. Should sales improve, there are no plans to reopen the facility, which has been converted into a distribution center with a staff of 12.

Osborne's director of human resources, Jeffrey Boynton, explained that "the market has changed so much, we had to question the economy of keeping a satellite open on the East Coast. We've gotten to the point with our new product [the Executive] where we need fewer people and less time to produce units."

Osborne has further moved to beef up its sales by effectively putting some price/performance distance between the Osborne 1 and the Executive, introduced this spring at a starting price of $2,495. The price of the former machine has been reduced from $1,995 to $1,295. Demand for the Osborne 1 has slumped due to the introduction of the Executive and increased competition, according to analysts. Boynton said he expected the "discount program" to create heavier demand for the older unit. He also maintained that sales of the Executive are "according to plan."

This is not the case, according to Christiansen, who maintains that Osborne first "miscalculated the life cycle" for the Osborne 1 and then "never figured plans for the Executive would go that far awry." The vendor made a key mistake in announcing the Executive four months before planned shipments, he said.

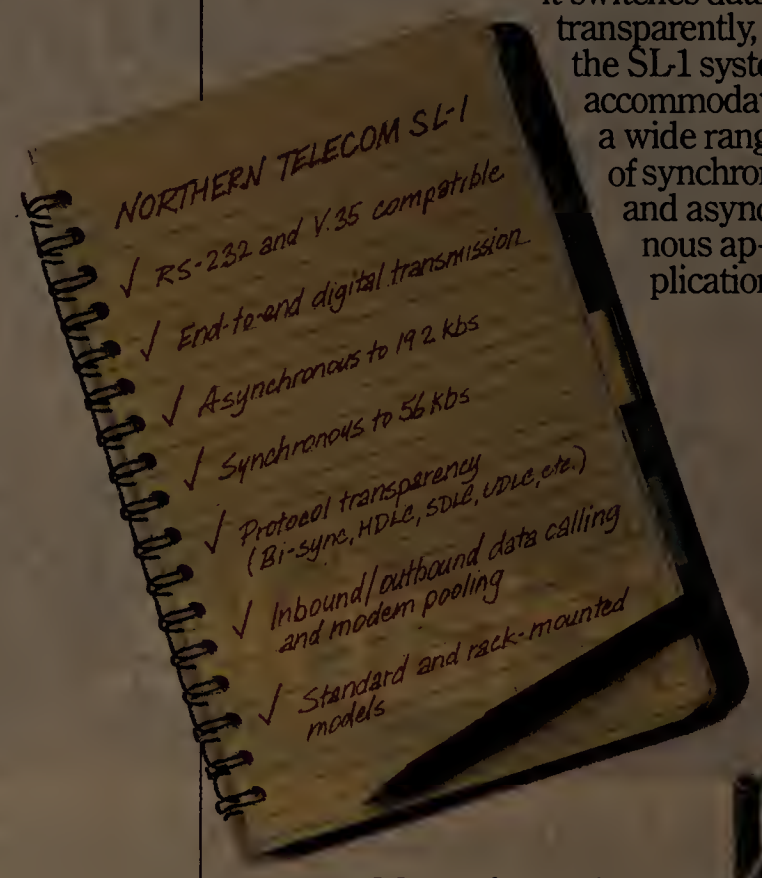
In doing so, the vendor inadvertently cut demand for the Osborne 1 as dealers decided to wait and restock with the Executive. When shipment of the Executive was delayed until June, dealers began to turn their attention to competing products.

The analyst also dismissed the "softening summer demand" theory postulated by company President Adam Osborne. "I don't see a summer slump affecting Kaypro or Compaq [Computer Corp.] sales," he said.

Dismissing growing criticism directed at the firm, Boynton said, "We're not as worried as the analysts are. We started this industry, and there are a lot of companies and analysts that would like to see us fail."

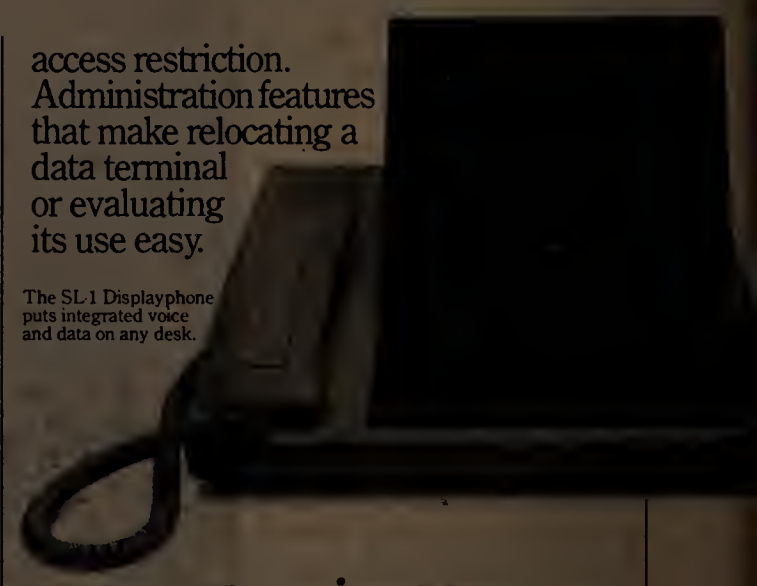
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Emerging AI Field Seen Taproot of Computing

By Tom Henkel
CW Staff

SCOTTSDALE, Ariz. — The next decade will decide whether DP professionals will become all-powerful corporate gods or wind up as outdated as elevator operators.

According to a soon-to-be-released report by DM Data, Inc., the taproot of the near-global reliance on computing is the emerging artificial intelligence industry. The impact AI will have on the data processing profession, however, is still unclear. Some argue DPers may wind up being done in by their own ingenuity, while others contend the power of the DPer can grow to near Herculean proportions.

By the end of this decade, AI is expected to have a $2 billion to $3 billion impact on business and industry, the report stated. AI will also help push computerization from the raised-floor environment of a data center to becoming integrated into virtually every part of a company, the DM Data report noted.

Major Players

Currently, the major players in the AI industry are a small group of individuals, university and corporate researchers, which make up about 30 companies, most posting annual sales of less than $5 million.

But the demand for AI is strong. DM Data said sales of AI products will grow to $2.5 billion by 1990, encompassing broader applications as electronic developments and software enhancements are made.

The real boom will take place soon after 1986 as the cost/performance ratio of AI products improves.

DM Data divided the AI industry into five broad categories: expert systems, natural language software, computer-aided instruction, visual recognition and voice recognition.

The segment of the industry expected to show the most dramatic growth and have the most significant impact on the DP department is natural language software, with a projected 80% compound growth rate through 1990.

With more natural language techniques being integrated into software packages, natural language techniques will grow to comprise more than 20% of the total software industry, topping the $1 billion mark by 1990, DM Data claimed.

Visual Recognition

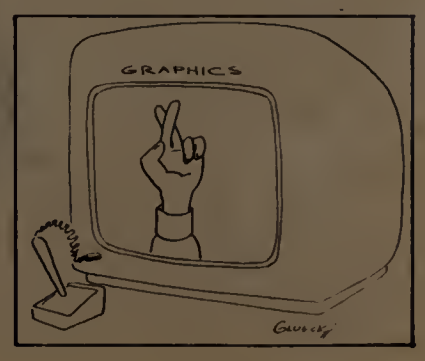
Visual recognition is also expected to undergo a compound growth of 55% over the next three or four years. The report said most of the applications of visual recognition will be restricted to stand-alone inspection, presenting less of a threat to the DPer than natural language software.

Fueled mainly by the U.S. military and Japanese, expert systems — or programs that offer advice based on the combined knowledge of several human experts in the field — will show some growth over the next three years. But there are still problems with the development of sophisticated expert systems. The cost, for example, can be rather high.

In order to become a viable component of a computer system, voice recognition systems have to become more accurate and flexible, DM Data suggested.

This, the report said, probably will not happen until 1986-87 when advancements in AI software techniques can be used to make voice recognition systems actually understand words, rather than checking spoken sounds against a stored template of commands, the report said.

The DM Data report is called "The Emerging Artificial Intelligence Industry." It costs $395, the firm said from 6900 Camelback Road, Scottsdale, Ariz. 85251.



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Study Predicts 15.9% Annual Growth Rate

Micros Seen as Vanguard of Industry Growth

WELLESLEY, Mass. — Computer industry shipments will reach $92.4 billion by 1984, up from 1980's $51.2 billion — but mainframe and minicomputer shipments will slow down while microcomputer shipments skyrocket, a new study released by Venture Development Corp. (VDC) predicts.

The report, *The U.S. Computer Industry, Second Edition*, forecasts a 15.9% annual growth rate for the industry for the 1980-1984 time period. Shipments for 1983 will increase only 14.1% over 1982, but 1984 shipments will grow 15.4%, the study said.

Computer systems and peripherals represented more than half the total industry shipments in 1980 and will do so in 1984. Mainframe sales will grow only 2.7% in 1983 over 1982 levels, and minicomputers will increase 15.6% in sales volumes, the study said, but personal computers will post a 35.9% gain in 1983 sales and pick up 4.9% of the overall market share.

"Business users [of personal computers] will increase 40% per year for the next two years," according to Melissa Yonge, market analyst for VDC.

"The home and hobby market will not prove significant to the personal computer market. The slower growth in the home is attributable to handheld and portable computers which crowd the personal computers out," she said.

The value of terminal and related shipments will grow 15% annually to reach $7.3 billion in 1984, according to the study, which predicted that alphanumeric CRT terminals will be the largest revenue producer.

Serial printer sales will gain in the total unit printer sales, but will lose share over four years to electronic typewriters.

Independent software suppliers will see a 20.6% growth in their market from $5.5 billion in 1980 to $11.7 billion in 1984. Application software will capture the largest increase in relative shares, growing from 21.6% of revenues to 27% in 1984, the study said.

The study costs $1,050 from Venture Development, One Washington St., Wellesley, Mass. 02181.

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Photo by Karsh

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Most executives are not obtaining the information most valuable to them from today's computer systems.

Traditional DP design and management do not obtain results rapidly. They work well in processing the payroll, invoices, and routine paperwork. They often fail to give end users what they really need at their terminals. They rarely give executives the management information they need most. They are inflexible, expensive, and slow, and they result in very high maintenance costs. Typical corporations have a three- to four-year backlog of cost-justified applications waiting to be developed. Most corporations have an even larger backlog of applications that **should** be developed but that have not yet been formally requested.

Because of the rapid rate of change of the technology, strategic planning is needed. This should create an integrated view of future resources and a plan for getting from here to there in easy-to-implement stages.

The spread of minicomputers, networks, distributed processing, end-user software, office-of-the-future technology, and data base systems all make it absolutely vital to have a corporate strategy for their evolution. The strategy must be oriented to achieving major increases in executive productivity and a major speeding up of application development.

Strategy and strategic planning methodologies are discussed.

Major management changes may be needed to achieve the synthesis of office-of-the-future systems, DP, and corporate telecommunications.

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Executive Corner

● **William B. Nevers** has been elected senior vice-president, finance and administration, at Compucorp.

● **William Gimple** has been named vice-president of software development at Pyramid Technology Corp.

● **James Richard Ellis** has joined Integrated Office Systems, Inc. as vice-president of manufacturing.

● **Dick Popp** has been promoted to vice-president of product marketing at Paradyne Corp.

● **Jacob Ben-Zvi** has been promoted to vice-president, implementation systems development division, at Informatics General Corp.

● **David W. Schumaker** has been appointed vice-president, marketing programs, office and computer products, at Datapoint Corp.

● **Paul F. Fuller** has been appointed vice-president of software development at Applied Financial Systems, Inc.

● **Andy Reichert** has been promoted to senior vice-president of engineering and development at Vector Graphic, Inc. **Carlos Cardon** has joined the company as vice-president of engineering.

● **James G. Cole** has been named vice-president of sales for Syte Information Technology, Inc.

● **Lawrence J. Fortner** has been appointed vice-president, research and development, at Apollo Computer, Inc.

● **Edward R. Grant** has joined Amdahl Corp. as vice-president, division operations.

● **Joseph Anthony Krupansky** has been named vice-president of finance and chief financial officer of Fujitsu Systems of America.

● **Adm. Robert R. Inman**, chairman, president and chief executive officer of Microelectronics and Computer Technology Corp., has been elected to the board of directors of Tracor, Inc.

● **Michael I. Miller** has been elected vice-president and treasurer of Gould, Inc.

● **Lawrence J. Portner** has been appointed vice-president, research and development, at Apollo Computer, Inc.

● **James R. Donovan** has been named senior vice-president, corporate marketing, for McDonnell Douglas Automation Co.

● **Arthur E. Parsons** has been appointed senior vice-president, marketing and business development; **Jerome D. Barnla,** vice-president, corporate development and planning and **Roy K. Lewis Jr.,** vice-president, customer services at American Satellite Co.

Nashua Reaches Accord To Restructure Bank Debts

NASHUA, N.H. — Nashua Corp., plagued throughout 1982 with financial losses, has announced it has reached agreements with its creditors to restructure its outstanding bank debt on a worldwide basis. The agreements cover loans made both to Nashua and its subsidiaries.

Due to losses suffered last year, the company was unable to comply with loan repayment schedules. The new agreements, however, nullify all existing loan defaults, the office systems maker said.

Key provisions of the restructuring include: a schedule for periodic pro rata reduction of Nashua's bank debt, measures to collateralize debt with company assets, the imposition of limitations on levels of inventory and rental assets in Nashua's office systems business, a continued suspension of dividend payments and a limitation on capital expenditures that will still permit the company to carry out its plans for funding its computer products division and other growth businesses.

Commenting on the agreement, Charles E. Clough, company president and chief executive officer, said, "The financial limitations ... are consistent with our plans for strengthening the balance sheets and improving business operations worldwide.

In its most recent quarter, the company reported profits of $4.5 million or 96 cents per share.



Tanks for the Demo

To prove the durability of its fiber-optic cable, Fibronics International, Inc. of Hyannis, Mass., recently put the cable to the "tread test."

Print Industry Grows by 19%

NEWTONVILLE, Mass. — Spurred on mostly by the continuing sales growth of low-cost serial matrix printers and the healthy demand for daisywheel printers, the worldwide printer industry experienced growth in revenues to $7.76 billion in 1982, up 19%, according to a recent survey.

"Computer and Word Processing Printer Markets: Analysis and Projections," by Datek Information Services, Inc., said the growth trend is expected to continue, with this year's printer industry growth projected at 20% to 25%.

As the cost of low-speed serial matrix printers dropped and speed increased, the article said, the demand in the home, personal and small business markets grew to over $1.4 billion worldwide and has continued into this year as prices dropped to as low as $249 for a 50 char./sec unit. Comparable price reductions have also been seen on medium and high performance models.

Dramatic Price Reductions

Shipments and dollar values continued to flourish in the full character serial printer market also, as daisywheel and thimble-type printers racked up sales of 604,000 units, according to Datek, which publishes the analysis each year in the annual report. This market also was characterized by dramatic price reductions on new units and the emergence of a new class of low-priced, low-speed models.

The expensive, high-volume printers such as line printers and nonimpact page printers were somewhat more susceptible to a slow economy, according to Datek, and registered disappointing growth with unit shipments remaining relatively flat compared with 1982.

Full-character line printers showed the effects of another year of tepid mainframe sales as shipments totaled 96,500 units worldwide, Datek said.

The publication is available for $25 per copy, postpaid in North America, from Datek Information Services, P.O. Box 68, Newtonville, Mass. 02160.

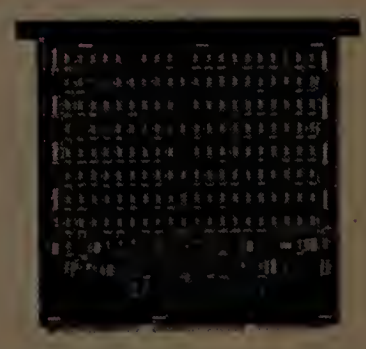
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Delta Drilling
DePaul University
Detroit Edison
Digicon
Dillingham
Dome Petraleum
Dow Chemical
Dow Corning
Drazen-Brubaker
Dresser Industries
Dulux Points
E.I. duPont de Nemours
Duquesne University
Duval
Dyno Industrier
Eastern Associated Coal
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Fisher Price Toys
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FMC
Ford
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Functionality Group
Fundidora Monterrey
F.W. Woolworth
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EXECUCOM

Acquistions May Come Slower To Encore Than Capital: Analysts

By Patricia Keefe
CW Staff

NEW YORK — Encore Computer Corp., a holding company for smaller technology concerns, is solidly staffed and will obtain all the growth capital it needs while still maintaining control of its operation, according to a number of Wall Street analysts.

However, these same analysts agree that acquisitions will not enter the Encore fold with quite the same speed likely to propel the flow of venture capital into the firm.

Because Encore President Kenneth Fisher, the marketing genius behind Prime Computer, Inc.'s earlier successes, has not been specific about the new venture's plans, the analysts interviewed based their opinions about the firm's future on the strength of its talent and current market conditions.

Encore was introduced to

(Continued on Page 92)



CW Photo by P. Keefe

Kenneth G. Fisher (right), Encore founder and Henry Burkhardt, vice-president of Encore's corporate development.

Integration, Synergism Vital Points

(Continued from Page 81)

between the way each company is structured.

Lanier's 2,000-person sales force, including its 700-person word processing sales staff, is entirely commissioned-based. The sales force has been characterized by a high turnover rate in the first months of employment. Salesmen are accustomed to making five or six sales calls each day, registering many small sales with what some of the analysts called high-pressure tactics.

On the other hand, members of Harris' sales force are salaried, with many earning less than their counterparts at Lanier.

Like other systems salesmen, the Harris people court just a few customers at a time. And from a total systems point of view, they are generally more sophisticated than the Lanier sales staffers.

Commenting on Lanier's commission-based sales force, Boyd said, "We will let them continue to operate this way. They don't make a lot more than our people do; they're just paid differently. Those who don't produce don't stay."

Boyd also defended allegations of high-pressure tactics within the Lanier sales ranks, saying, "It takes guts to make six sales calls a day. If you call it high-pressure, I'd like to have some."

The differences in sales forces notwithstanding, Boyd added that a big part of Harris' ticket into the office automation arena will be written by the 700 Lanier word processing salesmen. Beginning next February, the 700 Lanier salesmen will market and support Harris' 9000 series word processing system, announced three months ago when Harris had no sales force to market it.

Boyd said the Lanier sales force may also market Harris' low-end private branch exchange, which to date has been sold to OEMs only.

The Harris international sales force will begin marketing Lanier's stand-alone terminals, particularly in Europe, Boyd said.

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Encore's Management Line Seen Key to Success

(Continued from Page 91)
the press and Wall Street last month as an operating company looking to acquire small firms offering unique products in need of marketing, financial and administrative savvy — which Encore will provide. It will be an integrated manufacturing and marketing company serving worldwide markets, a spokesman said.

Said to be the first holding company of its kind in the computer industry, Encore is unlikely to encounter any problems in obtaining financial backing, according to industry analysts. "Some venture capital organizations have called me about investing in Encore," Marc Schulman, vice-president and analyst at First Boston Corp. here, said.

'Never Again'

Regardless of the kind of financial backing Encore is able to line up, Schulman said he was sure of one thing: "Ken Fisher will maintain control of Encore; by that I mean he will own more than anyone else. At Prime, he didn't have that control and we saw what happened there. [Fisher left Prime after several differences with Chairman David J. Dunn.] I'm sure he made a promise to himself of 'never again.' "

Although Fisher has stated Encore will not be going public within the near future, Schulman and Fred Cohen, a senior analyst with L.F. Rothschild, Unterberg, Towbin, guessed that it will do so by fall of 1984. Schulman said it would be unwise to wait until 1985, which would be early in the next presidential term when, historically, the business cycle is down.

While lauding the strength and experience of Encore's management lineup as key to its success, Schulman was less enthusiastic about the probable success of "encores to Encore."

A limiting factor in the proliferation of these types of umbrella ventures would be a serious lack of very senior-level management people capable of and willing to carry off similar ventures, the analyst said.

Cohen said it was "a real coup" on Fisher's part to have gathered the talent he did; however, he is not so sure that Fisher's venture will be "a screaming success. I'm not satisfied with the vast success they see for themselves," he said. "It will be less of an easy street than when Fisher joined Prime."

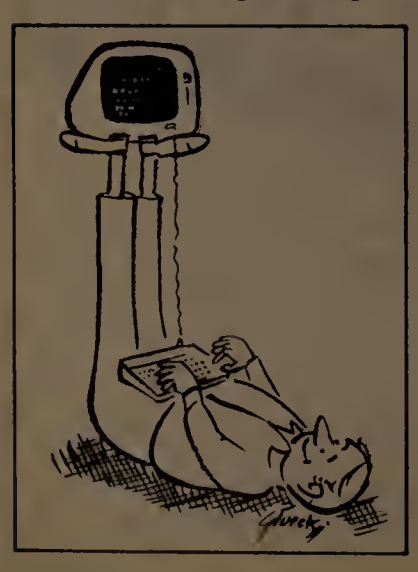
There is an abundance of both venture capital and marketing talent these days available to start-ups with good products, Cohen said.

He pointed to venture capital outfits such as the New York-based Sevin, Rosen, Bayless and Borovoy, which the senior analyst said can provide substantial operating experience and manufacturing connections with less overhead, as compared with Encore.

In addition, he pointed out that the cornucopia of available capital today will make it easier for entrepreneurs with innovative ideas who need financial backing, yet want to shape their own enterprise, to ignore overtures from Encore.

Another industry observer suggested Encore "had better" have two to three arrangements lined up by the end of the year, four or five by the end of 1984. He said that of the 100 or so start-ups that Fisher has been studying over the past year, Fisher told analysts that half the companies are not interested and another quarter Encore does not want.

"With the slush of venture capital available, the remaining firms under consideration could easily go out on their own," he added.



Nickels & Dimes

Tandy Corp. has reported preliminary sales for the fiscal year ending June 30, 1983, of $2.5 billion, 22% over fiscal year 1982. Consolidated sales for the month of June were $200 million, an increase of 15% over June 1982.

$ $ $

Dataproducts Corp. has reported revenues of $80.7 million and net income of $2.9 million or 15 cents per share for the fiscal quarter ending June 25, compared to revenues of $71.9 million and net income of $2.5 million for the same period last year.

$ $ $

Plantronics, Inc. has reported sales of $114 million for the fiscal year ending May 28, an increase of 3% over sales of $110 million in fiscal 1982. Earnings were $8.2 million or $1.27 per share, compared to $9.7 million or $1.50 per share for the previous year.

$ $ $

Equatorial Communications Co. has filed a registration statement with the Securities and Exchange Commission for an initial public offering of 2.2 million shares of common stock. Alex Brown & Sons and Robertson, Colman & Stephens will manage the underwriting group.

$ $ $

Triad Systems Corp. has reported revenue for the third quarter ended June 30 of $17.3 million, compared to $18.6 million for the same period last year.

$ $ $

Apollo Computer, Inc. has reported 1983 second quarter net income of $3.8 million or 19 cents per share, compared with a net loss of $199,000 or 5 cents per share for the same period in 1982. Sales for the six months ended July 2 were $31.7 million, more than six times the net sales for the first six months of last year.

$ $ $

Stratus Computer, Inc. has filed a registration statement with the Securities and Exchange Commission covering an initial public offering of approximately 3 million shares of common stock. The offering will be managed by Morgan Stanley & Co., Inc.; Alex Brown & Sons; and Hambrecht & Quist, Inc. Quist, Inc.

$ $ $

Systematics, Inc. has reported net income for the year ended May 31 of $4.7 million, a 45% increase over fiscal 1982.

$ $ $

Informatics General Corp. has reported revenues of $87.9 million for the six months ended June 30, a gain of 11% over the first half of 1982.

$ $ $

Plantronics, Inc. has reported sales of $114 million for the fiscal year ended May 28, an increase of 3% over fiscal 1982. Earnings were $8.3 million or $1.27 per share, compared to $9.7 million or $1.50 per share for the previous year.

$ $ $

AT&T has declared a dividend of $1.35 on its common stock, payable Aug. 1, 1983, to shareholders on record June 30, 1983.

$ $ $

Sparticus Computers, Inc. has received $3 million in venture capital funding, with the largest investment coming from Oak Partners II, Westport, Conn. Other investors are: Ventech Partners, Avon, Conn.; Robertson, Colman & Stephens, San Francisco; Cowen & Co., Boston; Bank of Boston; High Technology Lending Group, Boston; and MIT.

$ $ $

Tektronix, Inc. has reported earnings of $48.7 million or $2.57 per share for the fiscal year ended May 28, a 39% decrease over the same period last year.

$ $ $

Verbatim Corp. has reported net sales of $119.8 million for the year ended July 1, a 41% increase over fiscal 1982. Net income was $14.2 million or $1.27 per share, a 52% increase over last year.

$ $ $

Computer Task Group, Inc. of Buffalo, N.Y., has reported revenues for the first half of 1983 of $24.2 million, an increase of 22% over the same period last year.



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Nickels & Dimes

Xerox Corp. has reported a slight decline in earnings for the second quarter and first half year, but income from Crum & Forster Corp., a recently acquired insurance subsidiary, has boosted earnings per share for the first half by 7 cents to $2.66. Second quarter net income was $153 million, compared with $161 million for last year. Half-year net income was $282 million, up from $271 million in 1982.

$ $ $

Ask Computer Systems, Inc. has reported revenues of $39.4 million and net income of $3.9 million for the fiscal year ended June 30, up 58% and 45%, respectively, from last year.

$ $ $

NBI, Inc. has reported revenues for the fiscal year ended June 30 of $120.9 million, an increase of 21% over last year. Net income was $4.6 million, down 58% from fiscal 1982.

$ $ $

Software AG Systems Group, Inc. has reported revenues for the fourth quarter ended May 31 of $8.9 million, a 24% increase over the same period last year. Revenues for the year increased 22% to $30 million while net income increased 29% to $1.2 million.

$ $ $

Convergent Technologies, Inc. has reported revenues for the second quarter ended June 30 of $42.5 million, compared with $16.5 million for the same period last year. Revenues for the first half were $79.9 million, compared with $24.4 million last year. Earnings for the half were $7.8 million or 21 cents per share, compared with $3 million or 12 cents per share for the first half of fiscal 1982.

$ $ $

Docutel/Olivetti Corp. has reported revenues for the second quarter ended June 30 of $58.1 million, compared with $22 million for the same period last year. First-half revenues were $109.9 million, up from $40 million for the first half of 1982.

$ $ $

Paradyne Corp. has reported revenues of $48.5 million and a net loss of $919,000 for the second quarter ended June 30, compared with revenues of $48.5 million and a net income of $6.6 million for the same period a year ago.

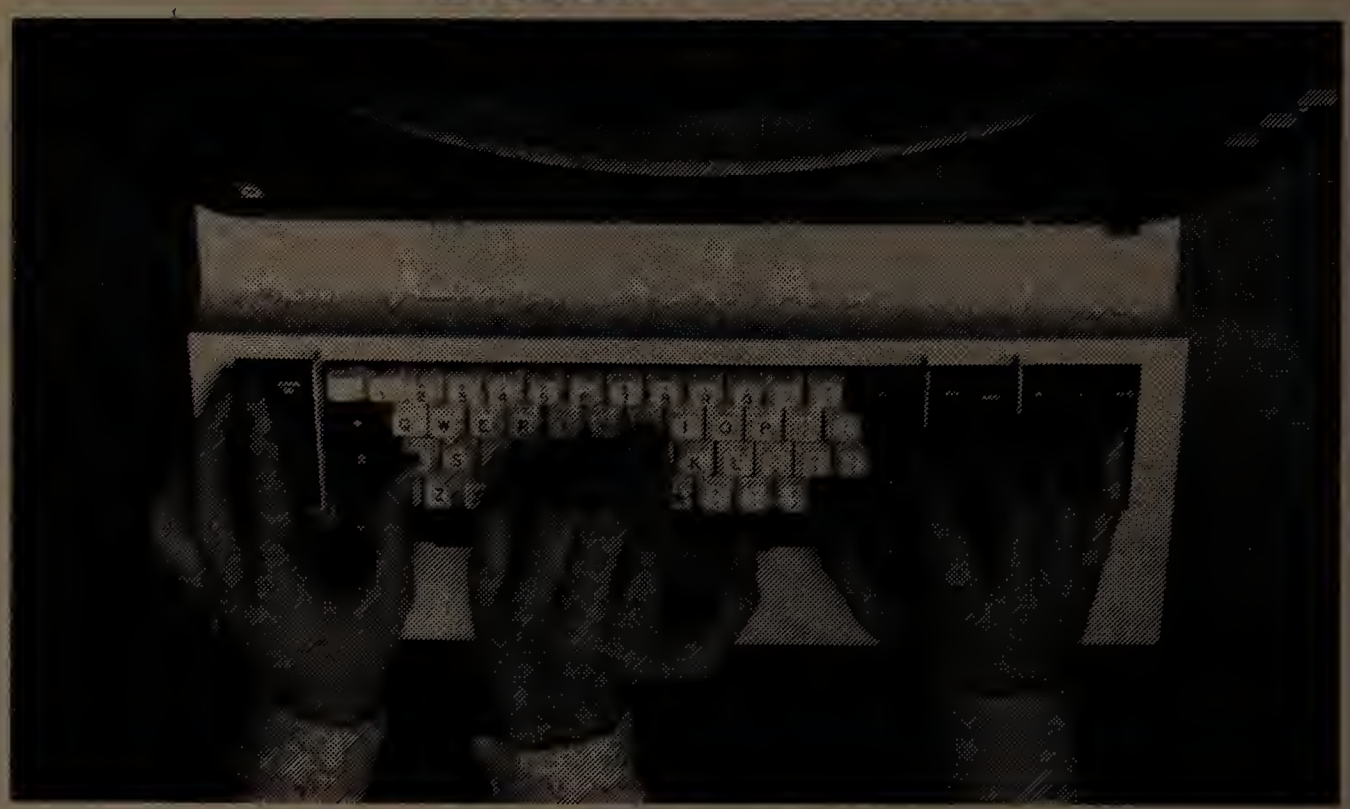
$ $ $

Applied Magnetics Corp. has reported net sales of $69.7 million and net income of $4 million for the nine months ended June 30. Net sales and net income for the same period last year were $67.9 million and $6.5 million, respectively.

$ $ $

MCI Telecommunications Corp. plans to file a registration statement with the Securities and Exchange Commission covering a public offering of 500,000 units, each consisting of $1,000 principal amount of 10-year subordinated notes and 17 five-year warrants to purchase common stock.

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Mergers & Acquisitions

E.F. Industries, Hawthorne, Calif., has purchased all the assets of **Datum, Inc.** for an undisclosed amount of cash. Datum's minicomputer controller products will become part of the line offered by Computer Storage Technology, Inc., a new company operated by E.F. Industries.

* * *

A. Johnson & Co. has acquired all outstanding stock of **Hekimian Laboratories, Inc.** of Gaithersburg, Md., a manufacturer of microcomputer-based telecommunications test equipment.

* * *

Computervision Corp., Bedford, Mass., has reached an agreement in principle to acquire **Organization for Industrial Research, Inc.** of Waltham, Mass., in exchange for Computervision stock.

* * *

Computer Resources, Inc., Cleveland, has reached an agreement to acquire **Tape Research, Inc.** of Cary, Ill.

* * *

Computer Task Group, Inc., Buffalo, N.Y., has acquired **Automated Business Systems, Inc.** of Rochelle Park, N.J.

* * *

Wang Laboratories, Inc. has acquired **Dictronics Publishing, Inc.**, a New York City-based software firm, and has merged the company with Wang's wholly owned subsidiary, Wang Electronic Publishing, Inc.

* * *

Sterling Software, Inc., Dallas, has signed an agreement in principle to acquire **Pacesetter Systems, Inc.**, also of Dallas.

* * *

Automatic Data Processing, Inc. has acquired GTE Telenet's brokerage services business, **GTE Telenet Information Services.**

* * *

Management Science America, Inc. has acquired all the outstanding stock of **Edu-Ware Services, Inc.** of Agoura Hills, Calif., a supplier of educational microcomputer software, for a combination of MSA stock and approximately $1.5 million and some deferred payments based on future revenues.

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- Dr. Howard Frank, President, ConTel Information Systems, Inc.
  "Local Networks: Before You Get One"
- Dr. Howard Morgan, Chairman, Advanced Office Concepts
  "Solving DP/WP Integration Problems"
- Edward Horrell, President, Mitchell & Horrell, Inc.
  "Integration through CBX Technology"
- Dr. John McQuillan, President, McQuillan Consulting, Inc.
  "Strategic Planning for Integration — Who, How, When & Why"
- Harry Newton, President, The Telecom Library
  "Personal Career Advancement Through Embracing Office High Technology"

Exhibits

There will be over 400 exhibits by leading information companies with the latest vendor architecture and technologies available. Special time is set aside for conference attendees to view all the exhibits and talk first-hand to the vendors. Exhibit hours are 12:00-6:00 p.m. Tuesday, 10:00 a.m.-6:00 p.m. Wednesday, and 10:00 a.m.-5:00 p.m. Thursday.

Conferences

Professional seminars and discussions concerning state-of-the-art-technologies will be led by the foremost experts in the field. It is the first time so many of the best and most renowned industry speakers will be gathered together under one roof to discuss the integration of communications, office automation and data processing.

General Sessions will be presented by professionals with 'hands-on' experience — professionals who have actually lived through the experience tell their stories and offer suggestions and solutions. Here's a sampling of the general session topics:

- *"Satellite Networks"*
- *"Network Intelligence"*
- *"The Multifunction Workstation"*
- *"Pilot Projects: Corporate PC Acceptance"*
- *"MIS — OA: Resolving the Conflicts"*



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In-Depth Tutorials

On October 31 some of the nation's leading consultants take the platform for a full day's formal instruction. These four concurrent in-depth tutorials include lecture notes, lunch and a reception with the speakers.

A — *"Corporate PC Management"* — Dr. Michael Hammer, Hammer & Co.
B — *"Advanced CBX Applications"* — Edward Horrell, Mitchell & Horrell
C — *"Local Area Networks"* — Dr. Ken Thurber & Dr. Harvey Freeman, Architecture Technology Corp.
D — *"Strategic OA Planning"* — Dr. John McQuillan, McQuillan Consulting



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How are minis and small business systems weathering the micro storm?



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How are 16-bit minis doing in a 32-bit world? How are they stacking up against the new mainframes? Against the multi-user micros? Can they survive being squeezed from both ends of the hardware spectrum? How do mini-based systems stand up against micro-based small business systems?

If these are some of the questions you're asking about minis and small business systems, then *Computerworld's* Special Report, "Minicomputers and Small Business Systems: Weathering the Micro Storm" is just what you've been waiting for. You'll get a full description of the evolution of minicomputer technology right up to state-of-the-art, and a discussion of how minicomputer manufacturers are fighting back against the price and performance offered by the manufacturers of multi-user micros.

You'll read why the 16-bit machine isn't dead — why it's still a viable product. You'll get a clear definition of the differences between minis, micros, and between minicomputer-based and microcomputer-based small business systems. You'll get a comparison between minis and the new, smaller mainframes. And, you'll get application stories and tutorials that put the whole market in perspective.

This Special Report will have articles designed to help you decide not only *what* but *how* to buy. You'll read articles that evaluate the benchmark studies out there so you can judge the tests and performance ratings for yourself.

And — to give you the complete picture — you'll get a good look at the other side of the market with a rundown of the benefits to be gained from using a multi-user micro in place of a mini.

With the ever-increasing number of systems to choose from, each day you delay in making a purchase decision means there are more systems to investigate. This September 26th Special Report is just what you need to clear up the confusion that you're faced with when deciding on the best system to meet your needs.

And if you sell to buyers of minis and small business systems, this is where you'll find your best prospects on September 26th — reading *Computerworld's* Special Report on minis and small business systems. Will the information they get be complete without news of your products? Ad close for this Special Report is September 9th.

Contact your local sales representative at one of the offices listed below or call Don Fagan, Vice President, Sales at (617) 879-0700.

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Supershorts

Develcon Electronics, Inc. has established a national distributor network for its data transmission products and named John D. Roberts, formerly with Infotron Corp., as national distributor sales manager.

* * *

Data Electronics, Inc., (DEI) of San Diego, and **Tandberg Data** of Oslo, Norway, have announced an agreement in principle covering the cross-licensing and technology exchange of current and future products. Included in the agreement is the joint development of a ½-in. tape cartridge drive, based on DEI prototypes, using Tandberg Data moving-head technology.

* * *

Modular Computer Systems, Inc. has formed a government systems division and named Richard F. Moltzon general manager.

* * *

Xerox Corp. has made a $5 million grant of 1,000 computers to the National Urban League for inner-city high schools with large enrollments of black and other minority students.

* * *

Multiplications, Inc. has licensed Accolade, its CICS application development product, to General Electric Information Services Co. (Geisco). Under the agreement, Geisco will offer Accolade over its Mark 3000 service network. The license also permits Geisco to develop custom software for clients and to utilize Accolade to develop proprietary software products.

* * *

Duquesne University has purchased $1.7 million in **Sperry Corp.** computer communications equipment to supplement the university's mainframe computer. The order includes 62 Sperrylink office systems units and 36 UTS 400 terminals.

* * *

Digital Equipment Corp. and **Synercom Technology, Inc.** have announced an agreement to market cooperatively Synercom's mapping information management systems and DEC's VAX-11 32-bit superminicomputer systems.

* * *

Bolt Beranek and Newman, Inc. (BBN) has been awarded a $9 million contract by MCI Telecommunications Corp. for a private packet-switched network. BBN will supply hardware, software, engineering services and maintenance for a two-year period.

* * *

Clarkson College will supply all incoming freshmen with Zenith Data Systems Corp. Z-100 desktop computers for use during their years at the college. Upon graduation, each student will have the option of keeping the computer.

* * *

Tandem Computers, Inc. has formed a new Federal Systems Division. George Eckert has been named vice-president and general manager of the division.

Shipment Rates Of Asic Chips Seen Growing

SAN JOSE, Calif. — Shipments of application-specific integrated circuits (Asic) will grow at a compounded annual rate of 25% through 1990, exceeding $19 billion and 50% of all integrated circuit shipments by the end of the decade, according to the Semiconductor · Industry Service of Dataquest, Inc.

Application-specific circuits are defined as any circuit designed or adapted to a particular user or application, Dataquest said.

According to a monthly newsletter issued by the company, the emergence of the commercial computer-aided design and electronic design automation (EDA) markets is the most significant factor leading to the rapid growth of the Asic market. The EDA market will grow faster than 65% per year over the next five years, growth driven by demand from a large number of potential end users who, until now, have not had the ability to design Asics, Dataquest said.

More information on the findings is available from Dataquest, 1290 Ridder Park Drive, San Jose, Calif. 95131.

CDC Acquires 25% Stake In Software Firm

MINNEAPOLIS — Control Data Corp. has acquired a 25% stake in Holguin and Associate, Inc., an El Paso, Texas, software company.

CDC reportedly will provide certain business, financial and management services to assist Holguin in its growth.

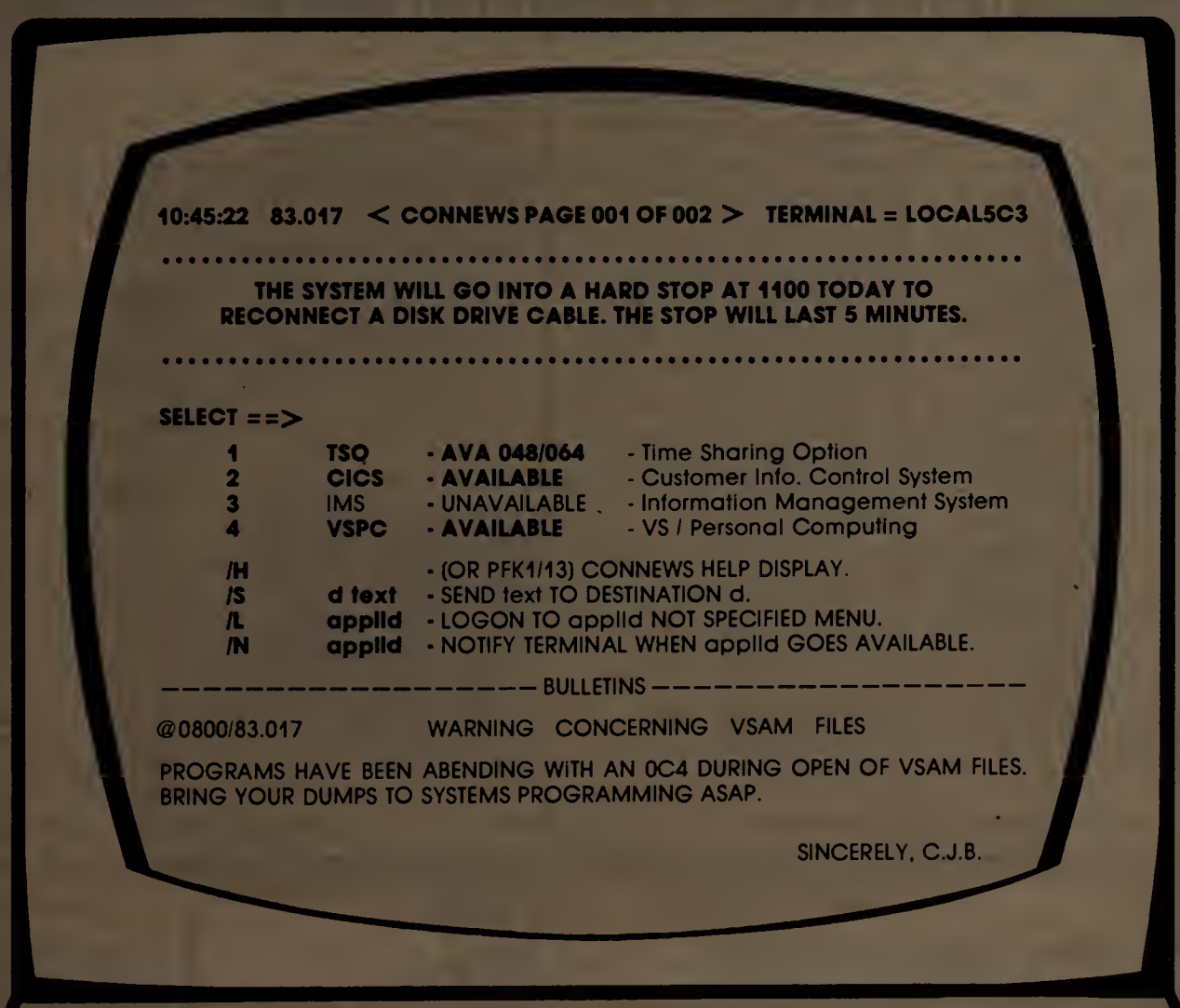
Holguin provides computer-aided design and drafting software and workstations for use with Hewlett-Packard Co. and Wang Laboratories, Inc. computers.

The equity venture is reportedly the first business relationship developed by the Control Data Software Co., a newly established operating division founded to establish the company as a significant software supplier.

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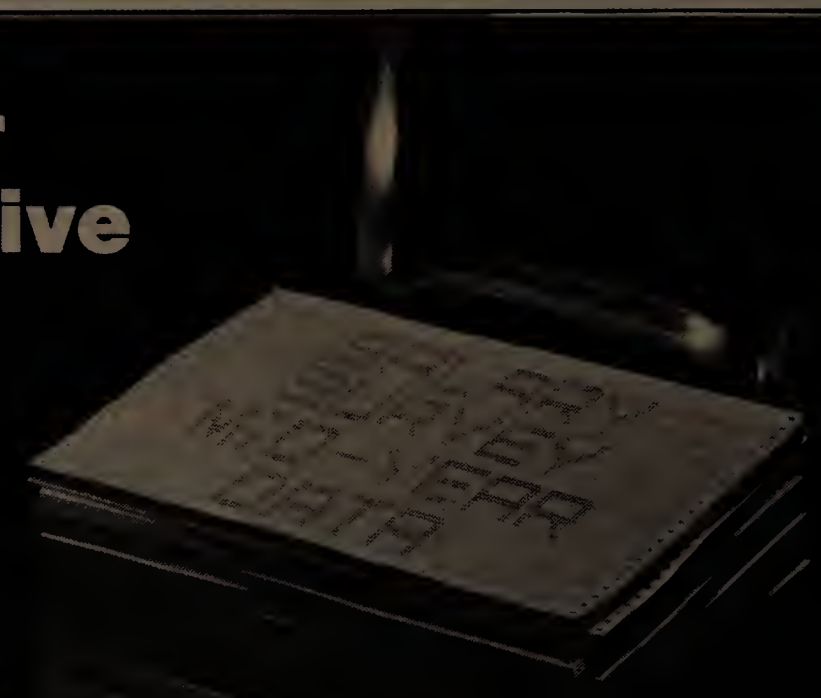
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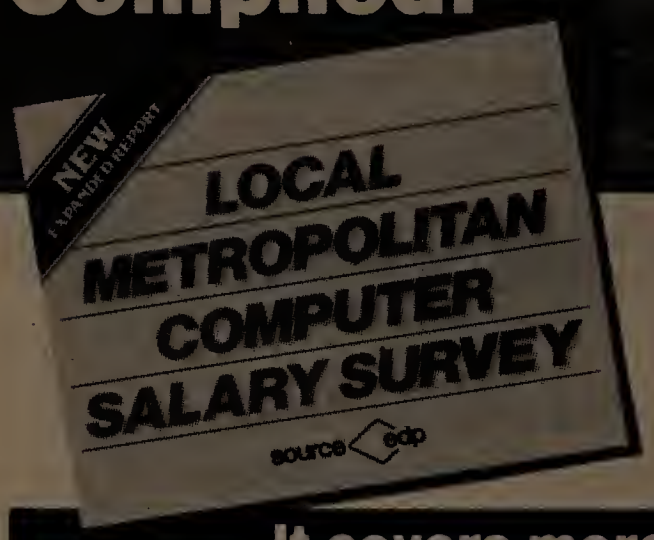
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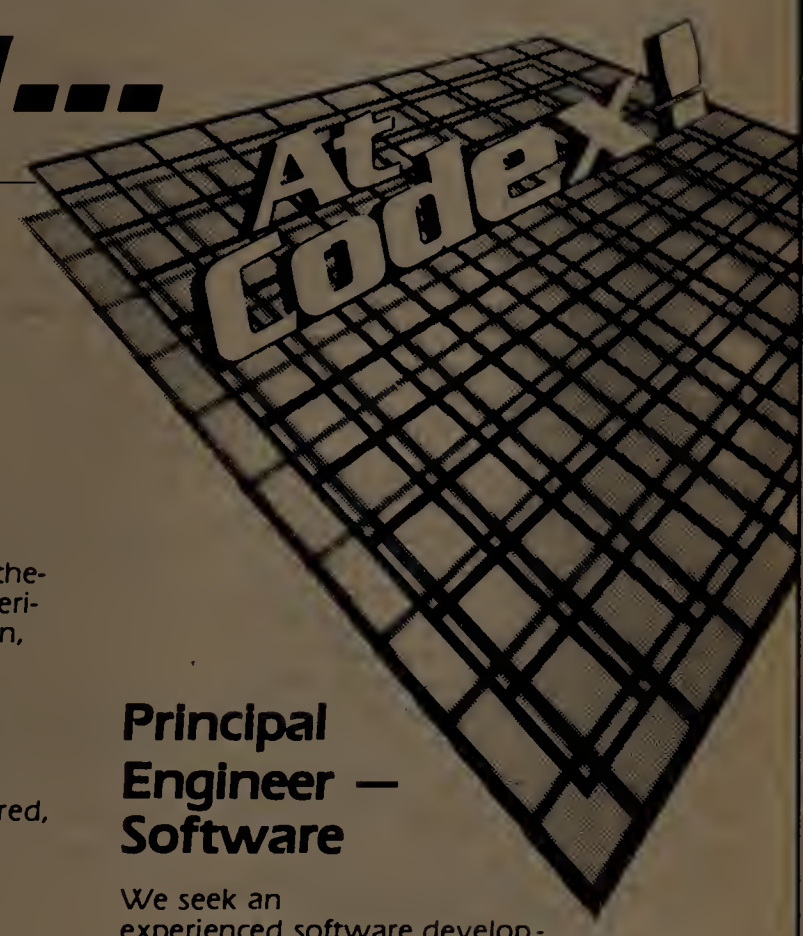
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Tandem Computers has local offices in:
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- Application Programmers

The Department of Computer Services is one of the largest D.P. facilities in the State of Arkansas and utilizes IBM 4341/AMDAHL 470-V6 operating under OS/MVS using primarily COBOL under IMS/CICS.

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We offer liberal fringe benefits and professional growth opportunities commensurate with ability. Job related education and/or experience may be considered as substitution for minimum qualifications.

Resume and salary requirements should be sent to:

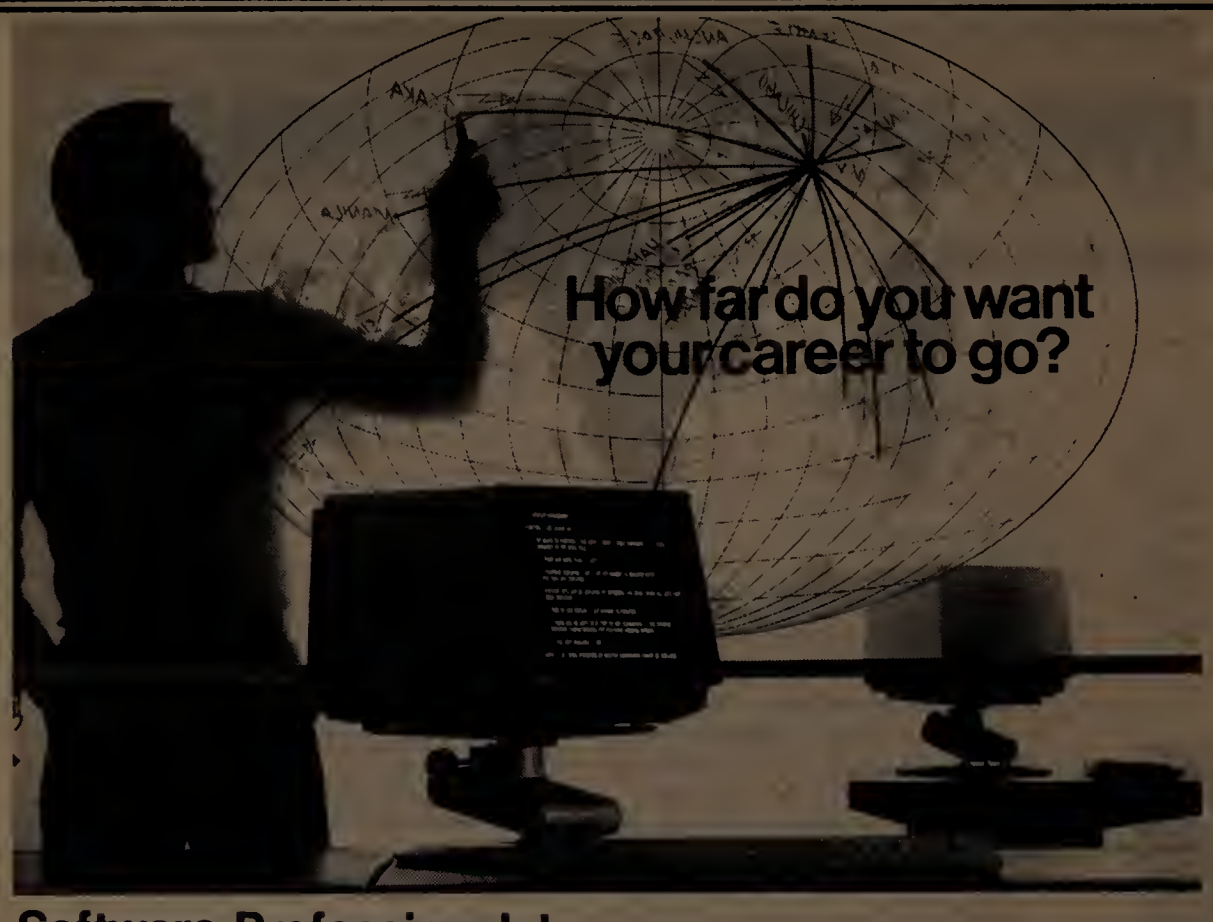
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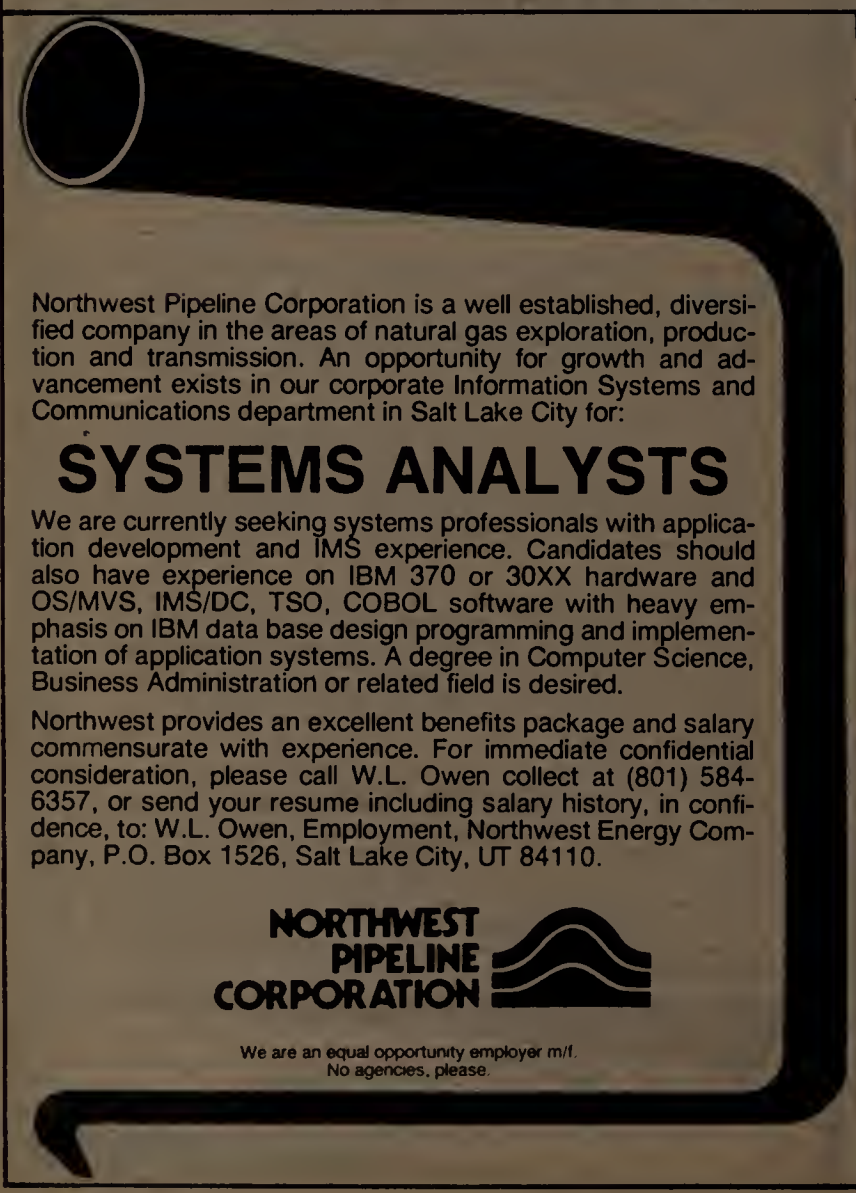
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Northwest provides an excellent benefits package and salary commensurate with experience. For immediate confidential consideration, please call W.L. Owen collect at (801) 584-6357, or send your resume including salary history, in confidence, to: W.L. Owen, Employment, Northwest Energy Company, P.O. Box 1526, Salt Lake City, UT 84110.

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MANAGER - Must have management experience in acquiring 3rd party software. Knowledge of licensing, royalties, specifications, and acceptance procedures is required.

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These positions in the simulation area require up to 6 months of training in California.

Xerox will be interviewing at the end of this month for these challenging positions. Qualified and interested candidates who want to take advantage of Xerox's excellent salary and benefit program, should act immediately. Send your resume to: Employment, Xerox Corporation, Office Products Division, MS 180, Dept. CW-815, 1341 W. Mockingbird Lane, Dallas, Texas 75247. Xerox is an affirmative action employer.

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Aurora, CO 80044

EOE M/F/V/H

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This system is being developed for an IBM 3083 computer using OS/MVS/CICS CAPEX, PANVALET, TSO/SPF software.

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Employment Division
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COBOL, ASSEMBLER, MARK IV

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Direct the activities of Bloomington Academic Computing Services, including all aspects of computing services delivery, data communications, computer operations, software support, user equipment acquisition, and user education. Monitor, evaluate, and recommend revision of systems to improve service or resource utilization. Develop and approve operating plans for the organization to ensure proper distribution of tasks. Work closely with Dean and faculty to guide long term direction of Academic Computing at IUB.

Masters degree as well as at least 7 years work experience in the area of computing, preferably in a university, is required. A terminal degree is preferred but not required. Candidates must have at least 5 years experience in managing a major functional area within a computing center (preferably at a university) and be able to demonstrate a high level of energy and interpersonal communication skills. Please submit application and vitae by September 15, 1983 to:

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7927 Jones Branch Drive
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J. Weatherly
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McLEAN TRUCKING COMPANY
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- Training Data Programmer
- Trainer / Advisor EDP + +

+ Programmer Experience not required.
+ + Prior military personnel preferred.

Bachelor's degree in computer science or related area and a minimum of three to five years experience is required. Additionally, for positions requiring programming background, at least two years or must have been spent in the programming field.

ALL TOURS ARE SINGLE STATUS

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William Misamore
Director, Computer Center
University of Wisconsin-Parkside
Box No. 2000
Kenosha, WI 53141
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INFORMATION SYSTEMS
ADMINISTRATIVE DATA PROCESSING
LOS ALAMOS NATIONAL LABORATORY

The Los Alamos National Laboratory, a multifaceted research and development facility operated by the University of California for the Department of Energy, has several positions available for Senior Programmer/Staff Member. These positions require extensive experience in developing financial, personnel, and/or materials management COBOL software systems.
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Elmer Salazar
Associate Group Leader, ADTS/ADC
Los Alamos National Laboratory, DIV 83-Y
Los Alamos, NM 87545

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Los Alamos
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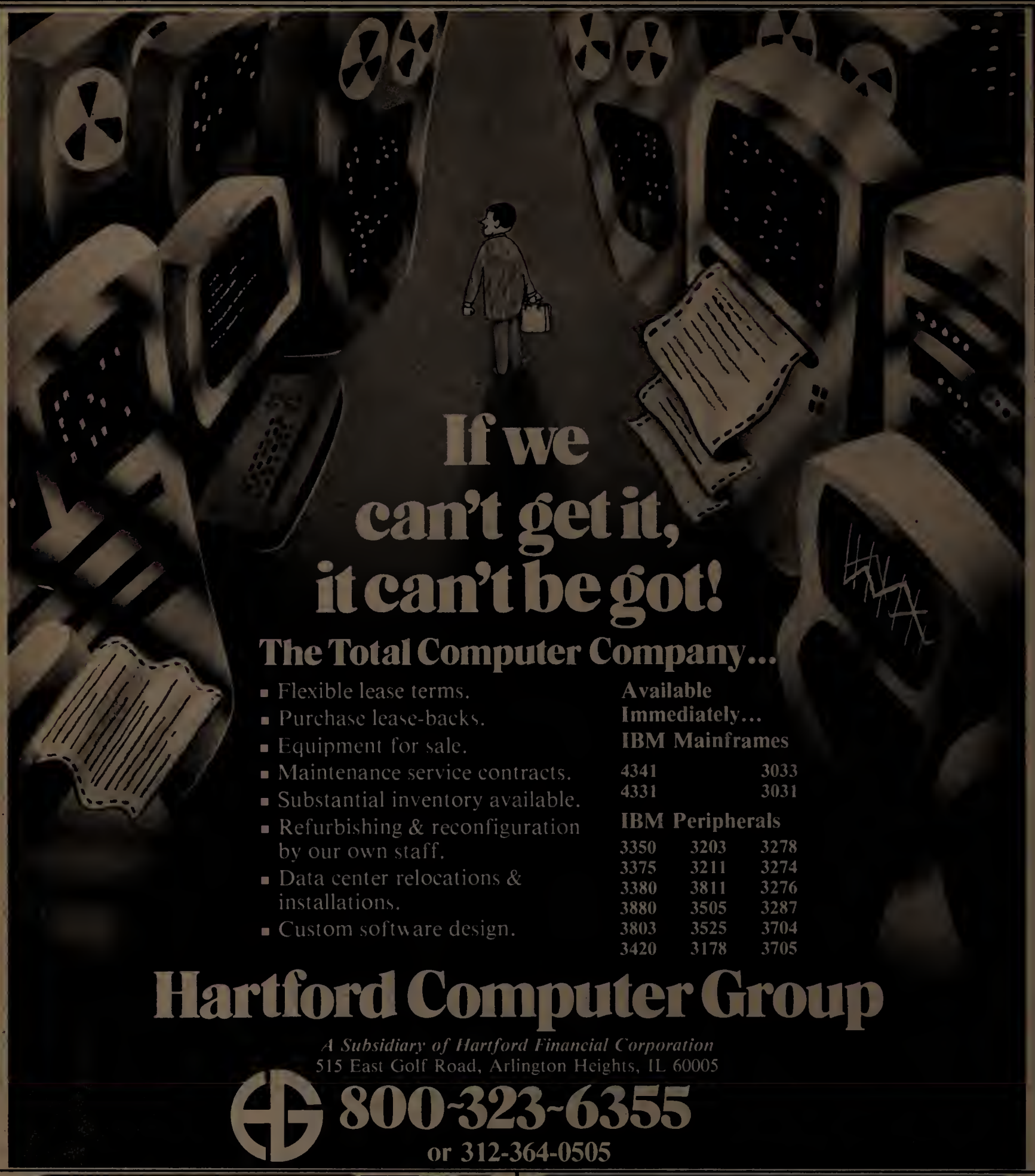


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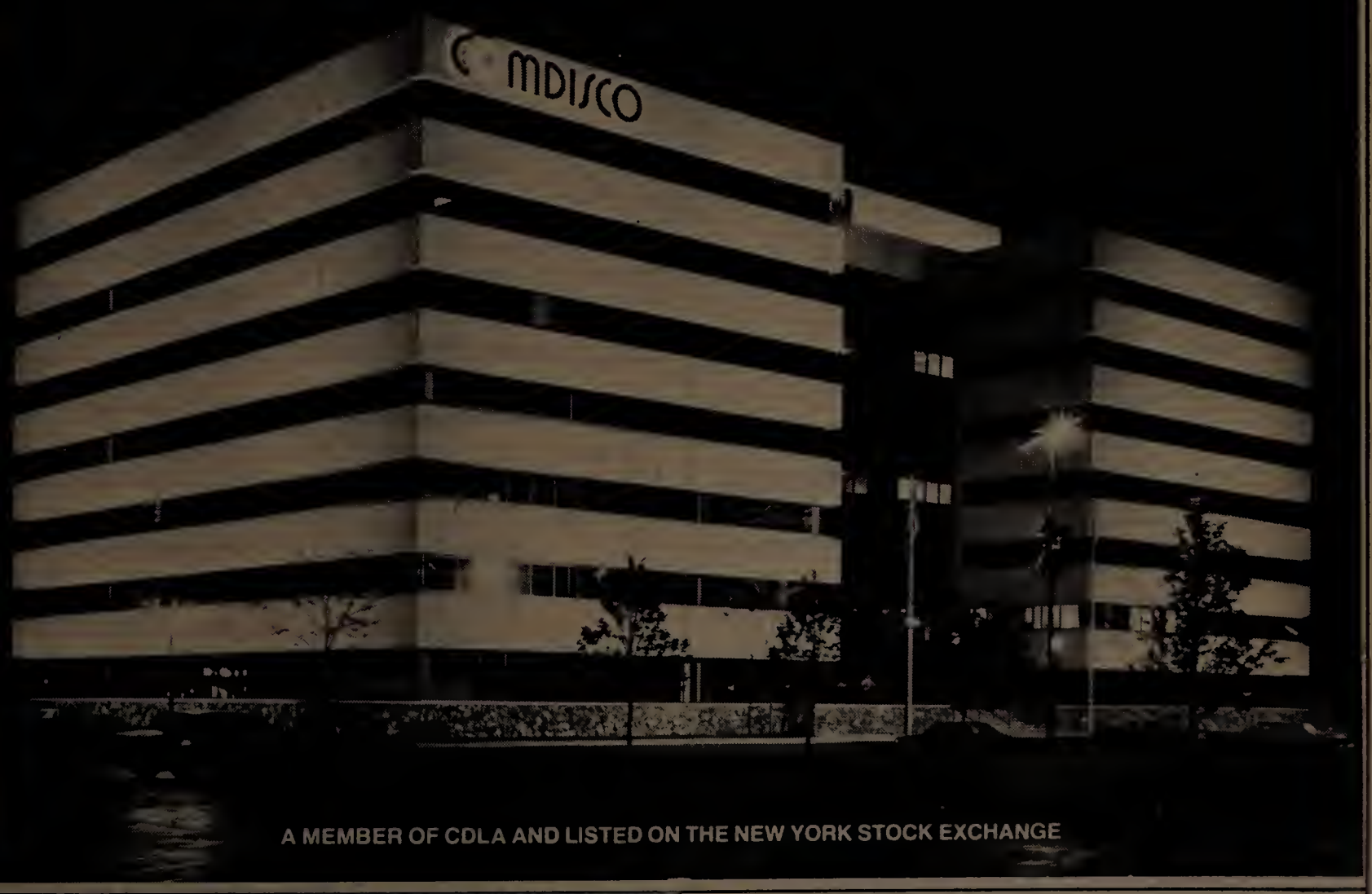
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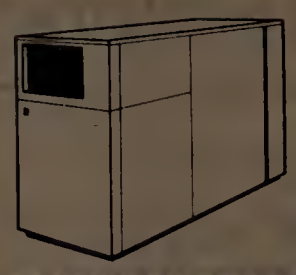
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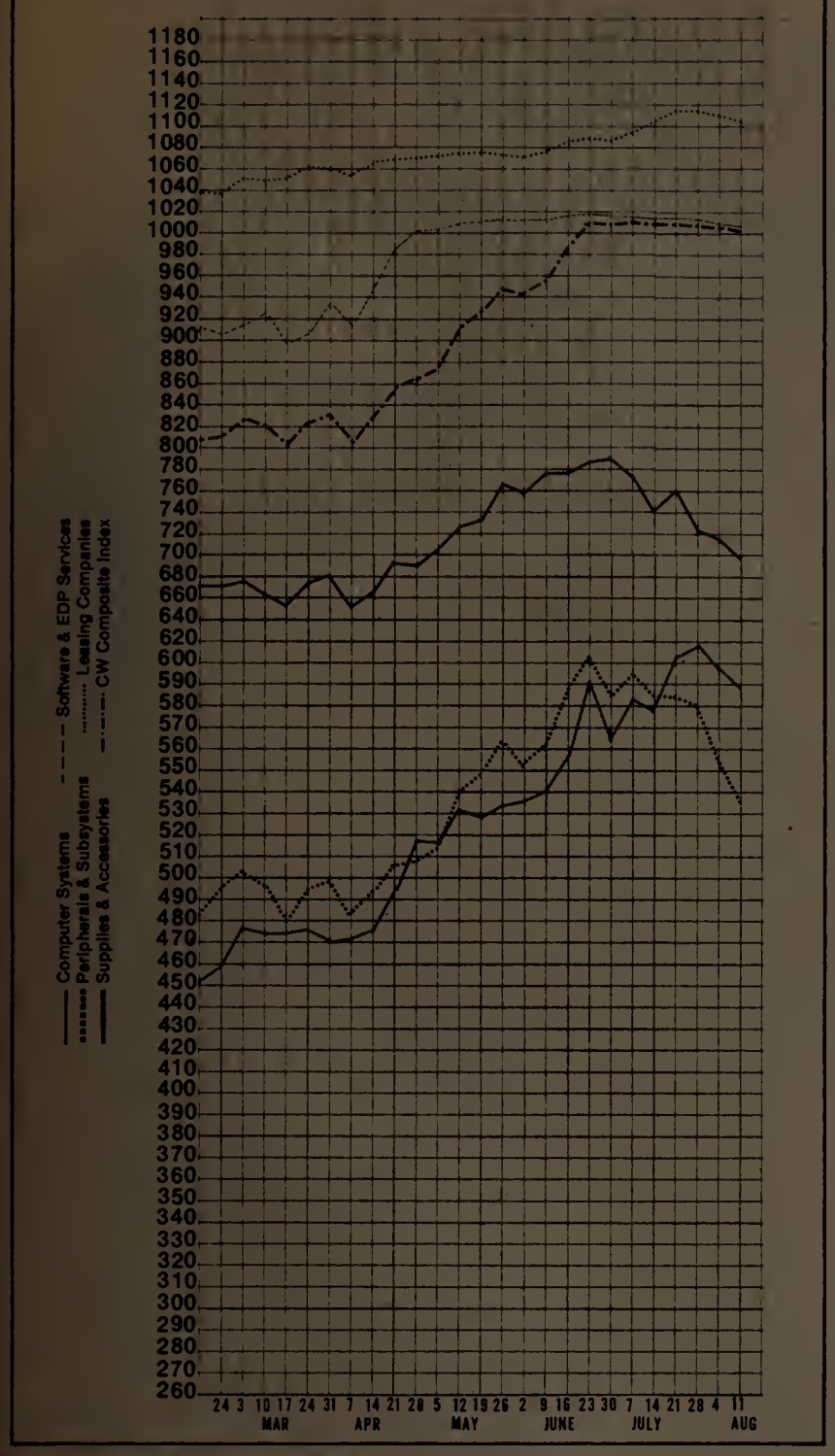
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Computerworld Stock Trading Summary

TRADE QUOTES

CLOSING PRICES WEDNESDAY, AUGUST 10, 1983

All statistics compiled, computed and formatted by TRADE QUOTES, INC Cambridge, Mass. 02139

EXCH		1982-83 RANGE (1)	CLOSE AUG 10 1983	WEEK NET CHNGE	WEEK PCT CHNGE
	COMPUTER SYSTEMS				
A	AMDAHL CORP	8- 30	18	-5 1/8	-22.1
N	BURROUGHS CORP	28- 58	50 1/8	-2 1/2	-4.7
D	COMPUTER AUTOMATION	7- 17	12 1/2	- 3/4	-5.6
A	COMPUTER CONSOLES	8- 26	20 5/8	-1	-4.6
N	CONTROL DATA CORP	21- 62	52 5/8	- 1/2	-0.9
N	CRAY RESEARCH INC	20- 52	46 3/8	-1 5/8	-3.3
N	DATA GENERAL CORP	20- 74	73	+4	+5.7
N	DATAPOINT CORP	11- 36	20 1/2	-1 1/8	-5.2
N	DIGITAL EQUIPMENT	62-132	99	-4 3/8	-4.2
A	EECO INC	8- 18	14 1/8	- 5/8	-4.2
N	ELECTRONIC ASSOC.	5- 15	13 3/4	- 1/4	-1.7
N	FLOATING POINT SYST	16- 44	36 3/4	- 3/4	-2.0
N	FOXBORO	22- 47	36 5/8	+1 5/8	+4.6
O	FULCRUM COMP GRP	1- 3	1/4	0	0.0
O	GENERAL AUTOMATION	3- 16	12 5/8	+ 1/8	+1.0
N	HARRIS CORP	20- 51	37 5/8	-2 1/2	-6.2
N	HEWLETT-PACKARD CO	36- 96	84 1/4	- 3/4	-0.8
N	HONEYWELL INC	60-125	119 1/8	+ 1/4	+0.2
N	IBM	57-126	118 1/8	-3 1/8	-2.5
O	IPL SYSTEMS INC	5- 14	10 3/4	- 1/2	-4.4
O	MAGNUSON COMP SYST6	2- 5	7/8	- 1/8	-12.5
N	MANAGEMENT ASSIST	7- 18	10 1/8	- 5/8	-5.8
O	MINI-COMPUTER SYST	1- 2	1 5/8	- 1/2	-23.5
N	MODULAR COMPUTER SYS	6- 16	13 3/4	-1 1/8	-7.5
N	MOHAWK DATA SCI	10- 19	12 1/4	- 1/8	-1.0
N	NCR	38-128	119	-1	-0.8
N	PERKIN-ELMER	17- 35	32 3/8	+ 3/8	+1.1
N	PRIME COMPUTER INC	11- 30	15 1/4	-1 1/8	-6.8
N	SPERRY CORP	21- 44	42 7/8	-1 1/8	-2.5
O	TANDEM COMPUTERS INC	14- 34	29 1/2	0	0.0
N	TEXAS INSTRUMENTS	71-176	107 1/2	-2 1/2	-2.2
A	WANG LABS "B"	13- 42	32 1/8	- 7/8	-2.8
A	WANG LABS "C"	11- 42	32 7/8	- 1/2	-1.4
	LEASING COMPANIES				
D	BOOTHE FINANCIAL CP	22- 80	55	+1	+1.8
N	COMDISCO INC	7- 42	34 7/8	-1 3/8	-3.7
B	COMMERCE GROUP CORP	1- 1	1/4	0	0.0
O	COMPUTER INVSTRS GRP	1- 2	1	0	0.0
O	CONTINENTAL INFO SYS	3- 18	12	-2 1/4	-15.7
N	OPF INC	5- 14	11 7/8	-1 1/8	-8.8
D	ITEL	1- 3	1 1/2	0	0.0
O	LEASPAC CORP	1- 2	1/8	0	0.0
N	U.S. LEASING	18- 47	39 3/4	+ 1/4	+0.8

EXCH		1982-83 RANGE (1)	CLOSE AUG 10 1983	WEEK NET CHNGE	WEEK PCT CHNGE
	SOFTWARE & EDP SERVICES				
O	ADVANCED COMP TECH	1- 8	5 1/4	- 1/4	-4.5
O	ADVANCED SYSTEMS INC	6- 22	18 1/2	- 1/4	-1.3
O	AGS COMPUTERS INC	7- 32	25 3/4	-2 3/8	-8.4
O	AMERICAN SOFTWARE	21- 31	24 1/4	+ 3/4	+3.1
N	ANACOMP INC	9- 23	12 3/8	- 1/8	-1.0
O	ANALYSTS INTL CORP	5- 20	17 3/4	- 1/2	-2.7
A	APPLIED DATA RES.	8- 37	27	+ 3/4	+2.8
O	ASK COMPUTER SYSTEMS	12- 39	32 1/4	-3 1/2	-9.7
B	ASTRODYNE COMP INC	1- 7	5	+ 3/8	+8.1
N	AUTOMATIC DATA PROC	21- 44	36 1/4	-3	-7.6
O	CGA COMPUTER ASSOC	5- 15	11 1/4	-1 1/4	-10.0
O	COMPUTER ASSOC INT'L	6- 35	28 1/2	-2	-6.5
O	COMPUTER HORIZONS	8- 20	13 1/2	- 1/2	-3.5
O	COMPUTER NETWORK	4- 10	8 3/8	0	0.0
N	COMPUTER SCIENCES	11- 23	18	0	0.0
D	COMPUTER TASK GROUP	8- 22	14 3/4	- 1/2	-3.2
O	COMPUTER USAGE	2- 22	18	+ 1/4	+1.4
D	COMPUTONE SYSTEMS	12- 38	12 1/4	-1 1/2	-10.5
O	COMSERV CORP	10- 20	10 1/4	- 1/2	-4.6
O	COMSHARE	6- 13	10 1/4	- 7/8	-7.8
N	CULLINET SOFTWARE	12- 50	41 1/2	+ 7/8	+2.1
O	CYCARE SYSTEMS INC	8- 27	19 1/4	+ 1/4	+1.3
D	DATA DIMENSIONS INC	1- 2	3/4	0	0.0
O	DATATAB	0- 2	1 3/8	-	-4.3
O	DYATRON CORP	2- 4	3 3/8	+ 1/8	+3.8
N	ELECTRONIC DATA SYST	10- 42	35 1/2	-4 1/2	-11.2
N	INFORMATICS INC	10- 34	24 5/8	- 5/8	-2.4
O	INSYTE CORP	1- 3	1 1/2	0	0.0
O	IPS COMPUTER MARKET.	1- 2	1 1/8	0	0.0
O	KEANE ASSOCIATES	4- 15	11	- 1/4	-2.2
A	LOGICON	12- 44	39 3/4	-1 1/4	-3.0
O	MNGT SCI AMER INC	8- 33	25 3/4	- 1/2	-1.9
O	MATHEMATICA INC	12- 28	26 1/4	0	0.0
O	MATHEMATICAL APP GRP	12- 22	16	0	0.0
O	NATIONAL DATA CORP	5- 28	18 5/8	- 1/8	-0.6
O	PANSOPHIC SYSTEMS	8- 30	22 3/8	- 5/8	-2.7
N	PLANNING RESEARCH	6- 21	15 5/8	- 3/4	-4.5
O	POLICY MGMT SYSTS CP	38- 68	53 1/2	- 3/4	-1.3
O	PROGRAMMING & SYS	1- 6	4 3/4	- 1/8	-2.5
O	REYNOLDS & REYNOLD	17- 49	47 3/4	+ 1/4	+0.5
D	SEI CORP	11- 34	24	- 3/4	-3.0
O	SHARED MEDICAL SYST	13- 43	39 7/8	+2 3/8	+6.3
O	SCIENTIFIC COMPUTERS	6- 14	12 1/4	- 1/4	-2.0
O	SOFTWARE AG	5- 17	10	- 5/8	-5.8
N	TYMSHARE INC	12- 30	16 3/4	- 1/4	-1.4
A	URS CORP	5- 18	13 3/4	-1 1/2	-9.8
N	WYLY CORP	7- 17	13 1/4	+ 1/2	+3.9
	PERIPHERALS & SUBSYSTEMS				
P	AM INTERNATIONAL	2- 7	5 1/2	0	0.0
A	ANDERSON JACOBSON	8- 28	18 5/8	- 1/2	-2.8
D	AUTO-TROL TECHNOLOGY	8- 29	27	+ 1/2	+1.8
O	BANCTEC INC	7- 33	16 3/4	-1 1/4	-6.8
A	BEEHIVE INT'L	4- 15	11 3/8	- 1/2	-4.2
A	BOLT,BERANEK & NEW	9- 80	45	-4 1/4	-8.6
O	CAMBEX CORP	2- 4	2 1/4	- 1/8	-5.2
N	CENTRONICS DATA COMP	6- 28	24	0	0.0
A	CETEC CORP	4- 12	9 7/8	- 1/4	-2.4
O	COGNITRONICS	2- 20	12 1/8	+ 3/4	+6.5
O	COMPUTER COMMUN.	1- 2	2	0	0.0

EXCH		1982-83 RANGE (1)	CLOSE AUG 10 1983	WEEK NET CHNGE	WEEK PCT CHNGE
O	COMPUTER DEVICES INC	4- 21	6 3/8	-1 5/8	-20.3
O	COMPUTER TRANSCEIVER	4- 12	6 1/2	-1 1/8	-14.7
N	COMPUTERVISION CORP	19- 53	47 7/8	- 3/8	-0.7
N	CONRAC CORP	17- 38	20 1/2	- 1/4	-1.2
A	DATA ACCESS SYSTEMS	1- 4	1	0	0.0
A	DATAPRODUCTS CORP	16- 41	26	- 5/8	-2.3
A	DATARAM CORP	5- 12	10 1/2	- 7/8	-7.6
O	DATUM INC	2- 17	12 5/8	- 7/8	-6.4
O	DAVID JAMISON CARLYL	2- 7	2 3/4	- 3/8	-12.0
D	DECISION DATA COMPUT	3- 16	11 1/8	- 3/4	-6.3
O	DELTA DATA SYSTEMS	1- 4	2 5/8	- 1/4	-8.6
N	ELECTRONIC M & M	5- 11	7 7/8	- 1/4	-3.0
O	EVANS & SUTHERLAND	18- 50	41 1/2	- 1/4	-0.5
D	GANDALF TECHNOLOGIES	9- 22	10 1/4	+ 1/2	+5.1
N	GEN'L DATA COMM INC	6- 29	21 5/8	+ 3/4	+3.5
O	GENERAL TERMINAL CP	1- 2	1/2	0	0.0
D	GREAT SOUTHWEST INC	2- 6	2	0	0.0
N	HAZELTINE CORP	7- 31	23 3/4	+ 3/4	+3.2
O	ICOT CORP	3- 10	5 3/4	- 5/8	-9.8
D	INFORMATION INTL INC	10- 22	18 3/4	+2	+11.9
O	INTEL CORP	11- 45	38 1/2	-2 1/4	-5.5
O	IPL SYSTEMS INC	5- 14	10 3/4	- 1/2	-4.4
A	LUNOY ELECTRONICS	7- 19	18 3/8	+ 1/2	+2.7
A	MSI DATA CORP	14- 36	19 1/8	+ 3/4	+4.0
O	NETWORK SYSTEMS CORP	8- 34	28	-1 5/8	-5.4
D	OMEX	3- 6	6	0	0.0
N	PARADYNE CORP	15- 30	16 3/4	+ 1/2	+3.0
A	PENRIL CORP	7- 14	11 3/8	- 1/4	-2.1
O	RAMTEK CORP	12- 26	15	- 1/2	-3.2
N	RECOGNITION EQUIP	4- 17	13 5/8	+ 3/8	+2.8
O	SCAN DATA	1- 3	2	- 3/4	-27.2
N	STORAGE TECHNOLOGY	16- 33	21	+1 3/8	+7.0
D	SYKES DATATRONICS	6- 27	8	- 3/4	-8.5
A	T BAR INC	7- 17	11 3/8	-1 5/8	-12.5
A	TAB PRODUCTS CO	8- 30	26 3/8	-1 1/8	-4.0
A	TEC INC	6- 12	7 3/4	- 1/4	-3.1
N	TEKTRONIX INC	34- 87	72 3/4	-2 3/4	-3.8
N	TELEX	5- 32	26 5/8	-1	-3.6
O	TESDATA SYSTEMS CP	3- 17	13 7/8	-1 1/4	-8.2
N	TIMEPLEX INC	7- 29	21 3/8	-2 1/2	-10.4
O	VISUAL TECHNOLOGY	8- 26	18 3/4	-1	-5.0
D	WILTEK INC	1- 4	1 1/2	+ 1/8	+9.0
	SUPPLIES & ACCESSORIES				
N	AMERICAN BUS PRDS	11- 31	28 7/8	+ 3/4	+2.8
O	BALTIMORE BUS FORMS	1- 2	1 1/4	0	0.0
N	BARRY WRIGHT	13- 31	28 1/8	- 3/8	-1.3
D	CYBERMATICS INC	1- 2	1 1/4	0	0.0
A	DUPLEX PRODUCTS INC	12- 28	22 1/2	+ 1/4	+1.1
N	ENNIS BUS. FORMS	6- 25	21 7/8	-1 3/8	-5.9
N	3M COMPANY	49- 90	78 3/4	-2 1/8	-2.8
N	MOORE CORP LTD	26- 51	43 1/2	-1	-2.2
N	NASHUA CORP	9- 29	25 3/8	-1 3/4	-6.4
O	STANDARD REGISTER	11- 34	32 1/2	0	0.0
N	WALLACE BUS FORMS	11- 30	24 3/4	+ 1/4	+1.0

EXCH: N=NEW YORK; A=AMERICAN; P=PACIFIC; B=BOSTON; L=NATIONAL; M=MIDWEST; O=OVER-THE-COUNTER
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